

MIDDLE FORK GOODNEWS RIVER FISHERIES STUDIES, 2000-2001



By

Jeffrey L. Estensen

Regional Information Report¹ No. 3A02-31

Alaska Department of Fish and Game
Commercial Fisheries Division
Arctic-Yukon-Kuskokwim Region
333 Raspberry Road
Anchorage, Alaska 99518

June 2001

¹The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Commercial Fisheries Division.

AUTHOR

Jeffrey L. Estensen is an Assistant Area Management Biologist for the Kuskokwim Area and the project leader for the Middle Fork Goodnews River weir project. The author can be contacted at the Alaska Department of Fish and Game, Commercial Fisheries Division, P.O. Box 1467, Bethel, AK 99559.

ACKNOWLEDGEMENTS

The author thanks the Middle Fork Goodnews River weir crew "the weirdos", Rob Stewart, Donna Elliot, and Chris Bach for their dedication and hard work. Also many thanks to Mark Lisac and his crew from the Togiak National Wildlife Refuge for all their help, Roger Minton, Rainey Diel, and Wayne Schouten for filling in the gaps, and Charlie Burkey, Doug Bue, Doug Molyneaux, and Paul Salomone for their mentoring and support.

PROJECT SPONSORSHIP

This project was made possible through partial funding from the Federal Office of Subsistence Management (FOSM) grant # 709810J285, and from the U.S Fish and Wildlife Service.

OEO/ADA STATEMENT

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972. If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfield Drive, Suite 300, Arlington, VA 22203; or O.E.O., U.S. Department of the Interior, Washington DC 20240. For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 907-465-3646, or (FAX) 907-465-2440.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	v
LIST OF FIGURES	ix
LIST OF APPENDICES	x
ABSTRACT	xi
 INTRODUCTION	 1
Site Description	1
Project History	1
Salmon Fisheries	2
Escapement	3
Age, Sex, and Length	3
Aerial survey	4
Objectives	5
 METHODS	 5
Resistance Board Weir	5
Escapement	6
2000	6
2001	6
Age, Sex, and Length	7
Aerial Surveys	8
2000	8
2001	8
Weir Maintenance, Cleaning, and Mortality Counts	8
Atmospheric and Hydrological Monitoring	8
2000	8
2001	8
 RESULTS	 8
Resistance Board Floating Weir	8
2000	9
2001	9

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Salmon Fisheries	9
2000	9
2001	9
Escapement	10
2000	10
2001	11
Age, Sex, and Length	11
2000 Escapement	11
2001 Commercial Harvest	13
2000 Escapement	13
2001 Commercial Harvest	13
Aerial Surveys	13
2000	13
2001	14
Mortality Counts	14
2000	14
2001	14
Atmospheric and Hydrological Monitoring	14
2000	14
2001	14
 DISCUSSION	 15
 LITERATURE CITED	 17
 TABLES	 19
 FIGURES	 68
 APPENDICES	 74

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Historical commercial salmon harvest, District W-5, 1968-2001	19
2. Historical commercial effort and opportunity, District W-5, 1970-2001	20
3. Historical commercial salmon exvessel value, District W-5, 1990-2001	21
4. Historical salmon subsistence harvest, Goodnews Bay area, 1967-2001	22
5. Historical estimated salmon run size and fisheries exploitation rate, Goodnews River drainage, 1981-2001	23
6. Historical salmon escapement at the Middle Fork Goodnews River project, 1981-2000.....	26
7. Percentage of salmon escapement estimated at the Middle Fork Goodnews River project, 1991-2001	27
8. Aerial survey results, Goodnews River drainage, 1980-2000.....	28
9. Age and sex of chinook salmon at the Middle Fork Goodnews weir based on escapement sampling, 2000	29
10. Mean length (mm) of chinook salmon at the Middle Fork Goodnews weir based on escapement sampling, 2000	30
11. Age and sex of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000	31
12. Mean length (mm) of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000.....	32
13. Age and sex of chum salmon from the Middle Fork Goodnews River weir based on escapement sampling, 2000.	33

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
14. Mean length (mm) of chum salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000	34
15. Age and sex of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000	35
16. Mean length (mm) of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000	36
17. Age and sex of chinook salmon from District W-5 based on commercial harvest sampling, 2000	37
18. Mean length (mm) of chinook salmon from District W-5 based on commercial harvest sampling, 2000	38
19. Age and sex of sockeye salmon from District W-5 based on commercial harvest sampling, 2000	39
20. Mean length (mm) of sockeye salmon from District W-5 based on commercial harvest sampling, 2000	40
21. Age and sex of chum salmon from District W-5 based on commercial harvest sampling, 2000	41
22. Mean length (mm) of chum salmon from District W-5 based on commercial harvest sampling, 2000	42
23. Age and sex of coho salmon from District W-5 based on commercial harvest sampling, 2000	43

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
24. Mean length (mm) of coho salmon from District W-5 based on commercial harvest sampling, 2000	44
25. Age and sex of chinook salmon from the Middle Fork Goodnews River weir based on escapement sampling, 2001	45
26. Mean length (mm) of chinook salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001	46
27. Age and sex of sockeye salmon from the Middle Fork Goodnews River weir based on escapement sampling, 2001	47
28. Mean length (mm) of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001	48
29. Age and sex of chum salmon from the Middle Fork Goodnews River weir based on escapement sampling, 2001	49
30. Mean length (mm) of chum salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001	50
31. Age and sex of coho salmon from the Middle Fork Goodnews River weir based on escapement sampling, 2001	51
32. Mean length (mm) of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001	52
33. Age and sex of chinook salmon from District W-5 based on commercial harvest sampling, 2001	53

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
34. Mean length (mm) of chinook salmon from District W-5 based on commercial harvest sampling, 2001	54
35. Age and sex of sockeye salmon from District W-5 based on commercial harvest sampling, 2001	55
36. Mean length (mm) of sockeye salmon from District W-5 based on commercial harvest sampling, 2001	56
37. Age and sex of chum salmon from District W-5 based on commercial harvest sampling, 2001	57
38. Mean length (mm) of chum salmon from District W-5 based on commercial harvest sampling, 2001	58
39. Age and sex of coho salmon from District W-5 based on commercial harvest sampling, 2001	59
40. Mean length (mm) of coho salmon from District W-5 based on commercial harvest sampling, 2001	60
41. Daily atmospheric and hydrological data from the Middle Fork Goodnews River weir site, 2000	61
42. Daily atmospheric and hydrological data from the Middle Fork Goodnews River weir site, 2001	65

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Map of Goodnews River drainage.....	68
2. Map of District 5 (Goodnews Bay).....	69
3. Chinook salmon run timing at the MFGR weir, 2000	70
4. Sockeye salmon run timing at the MFGR weir, 2000.....	70
5. Coho salmon run timing at the MFGR weir, 2000.....	71
6. Chum salmon run timing at the MFGR weir, 2000	71
7. Chinook salmon run timing at the MFGR weir, 2001	72
8. Sockeye salmon run timing at the MFGR weir, 2001	72
9. Coho salmon run timing at the MFGR weir, 2001.....	73
10. Chum salmon run timing at the MFGR weir, 2001	73

LIST OF APPENDICES

	<u>Page</u>
Appendix A. Raw data from the 2000 and 2001 season	74
Appendix A1. Daily fish passage counts Middle Fork Goodnews River weir, 2000.....	74
Appendix A2. Daily fish passage counts Middle Fork Goodnews River weir, 2001.....	76
Appendix B. Goodnews and Middle Fork Goodnews Rivers roe retention study.....	78
Appendix B1. Summary of 2001 roe retention study.....	78
Appendix B2. Number of eggs retained from chinook and chum salmon, Goodnews and Middle Forks Goodnews Rivers, 2001	79

ABSTRACT

Commercial effort, opportunity, harvest, and age, sex, and length composition of the commercial harvest in District W-5 are summarized for the 2000 and 2001 seasons. Escapement estimates, abundance, and escapement age, sex, and length composition of chinook, *Oncorhynchus tshawytscha*, sockeye, *O. nerka*, coho, *O. kisutch*, and chum, *O. Keta*, salmon are summarized for the Middle Fork Goodnews River for the 2000 and 2001 seasons. Abundance data for chinook, sockeye, and chum salmon in the Goodnews River are summarized for the 2000 and 2001 season. A resistance-board floating weir was used on the Middle Fork Goodnews River to estimate escapement and to provide a platform for the collection of age, sex and length data. Chinook, sockeye, and chum salmon abundances in the Goodnews River were estimated using historical averages as no aerial surveys were flown in 2000. For 2001, aerial survey results were used to assess chinook, sockeye, and chum salmon abundances in the Goodnews River. In 2001, the escapement goal for sockeye salmon was not met at the Middle Fork Goodnews River weir, and aerial survey escapement objectives for both sockeye and chum salmon were not met for the Middle Fork Goodnews River. In 2000, the predominant age class for chinook and sockeye salmon in the escapement and commercial harvest samples was age-1.3. No age class composition for escapement is available for chum salmon, while age-0.4 fish were predominate in the commercial harvest. For coho salmon, age-2.1 fish predominated in both the escapement and the commercial harvest. In 2001, most of the chinook salmon in the escapement and commercial harvest were age-1.4, while age 1.3 sockeye salmon predominated in the escapement and commercial harvest. For chum salmon, escapement and the commercial harvest was primarily age 0.3 fish. Coho salmon in both the escapement and commercial harvest were primarily age-2.1 fish.

KEY WORDS: Goodnews, chinook, sockeye, chum, pink, coho, escapement, *Oncorhynchus*, *tshawytscha*, *nerka*, *keta*, *gorbuscha*, *kitsutch*, salmon

INTRODUCTION

Site Description

The Goodnews River drainage consists of three river channels that originate in the Ahklun Mountains and flow southwesterly until converging and emptying into Goodnews Bay (Fig. 1). The rivers drain approximately 1,000 m² (2,600 km²) of surface land area.

The Goodnews River, the major branch, flows for approximately 25 miles (40.2 km) within the boundaries of the Togiak National Refuge, continues another 22 mi (35.3 km) outside the refuge until emptying into Goodnews Bay. The upper half of the Goodnews River is primarily a single channel river draining mountainous area, while the lower half is braided and drains largely undisturbed tundra. The surrounding riparian areas are composed primarily of cottonwood, willow, and alder.

The Middle Fork Goodnews River is a 42 mi (67.6 km) long tributary which parallels the Goodnews River before joining it near the mouth. The upper 27 mi (43.8 km) of the Middle Fork flows within the boundaries of the Togiak National Refuge, while the remaining 15 mi (24.1 km), flows outside the boundaries. The upper half of the Middle Fork Goodnews River is primarily a single channel river draining mountainous terrain; the lower half is a single channel draining largely undisturbed tundra. The surrounding riparian vegetation is composed primarily of cottonwood, willow, and alder.

The Department currently operates a resistance board floating on the Middle Fork Goodnews River located approximately 11 mi (18 km) from the District W-5 commercial fishery (Fig. 1).

Project History

The Middle Fork Goodnews River (MFGR) project is the third oldest salmon escapement assessment project in the Kuskokwim Area. The project was initiated as a counting tower in 1981 and was operated through 1990 (Schultz 1982, 1984a, 1984b, 1985, 1987; Schultz and Burkey 1989; Burkey 1989, 1990). Although successful, the tower was limited by problems identifying species and high labor costs (Menard 1999). In 1991, resources were redirected towards a fixed-panel weir that operated through mid-season of 1997. The fixed-panel weir greatly reduced labor costs and improved species identification. However, the fixed panel weir was limited by frequent high water levels which often exceeded the height of the panels, rendering the weir inoperable. In some years during high water, the weir required dismantling to prevent its dislodgment.

In July 1997, the fixed-panel weir was replaced with a resistance-board floating weir designed to withstand high water levels (Menard 1998). The resistance-board weir has allowed the project to

remain operational during high water events, and to operate into September, traditionally a period of high water level.

Salmon Fisheries

Commercial fishing occurs in District W-5, the marine waters of Goodnews Bay located near the mouth of the Goodnews River (Figure 2). Commercial fishing is conducted primarily with drift gillnets in the tidal channels in Goodnews Bay, and with gillnets set near the mouth of the bay. The fishery is directed towards sockeye, *Oncorhynchus nerka*, and coho, *O. kitsuch*, salmon. Chinook, *O. tshawytscha*, and chum, *O. keta*, salmon are harvested incidentally. Pink salmon, *O. gorbushcha*, is the least commercially valuable species and is not targeted.

Since its establishment in 1968, commercial salmon harvests in District W-5 have averaged 61,928 fish, ranging from 2,879 fish in 1971 to 166,053 fish in 1994 (Table 1). Over the last 5 years, commercial harvests have been below the most recent 10-year average of 78,884 fish (Table 1), likely a result of declining effort in the district since 1996 (Table 2). In recent years the number of permits fishing the district has been below the most recent 10-year average of 81 (Table 2). The observed decline in effort is likely a result of the poor market value of salmon since 1995, increasing fuel prices, and other economic opportunity in the area. Collectively, these factors have resulted in the value of the commercial fishery in the district having been below average since 1996 (Table 3).

Subsistence fishing for salmon occurs throughout the Goodnews River drainage, and in other freshwater streams throughout the district. Subsistence caught salmon are an important food source for many of the local residents in the area, making a vital contribution to their annual subsistence harvest. The Department has quantified subsistence harvests in Goodnews Bay since 1968. Annual subsistence harvests average 744 chinook, 729 sockeye, 311 chum, and 724 coho salmon (Table 4).

The combined commercial and subsistence exploitation of the Goodnews River salmon runs has averaged (most recent 10-year; 1991-2000) 25.8% for chinook salmon with a range of 18 to 50%, 27.4% for sockeye with a range of 14 to 43%, and 19.3% for chum with a range of 7 to 38% (Table 5). No exploitation data is available for coho salmon because of the lack of drainage wide escapement data.

Sport fishing occurs throughout much of the Goodnews River drainage. Many sport fish anglers take float trips from the lakes to Goodnews Bay. During the 1990s, a semi-permanent sport fishing lodge was located on the Goodnews River approximately one mile up-river from its confluence with the MFGR. Also, one temporary sport fish camp is located on the MFGR, approximately 15 miles upriver from the confluence of the Goodnews and MFGR.

Escapement

The Goodnews River Drainage is the primary salmon spawning drainage in District W-5; the Goodnews River and MFGR are the primary spawning rivers in the drainage. Salmon escapement in the Goodnews Drainage is assessed by salmon passage at the MFGR weir and by aerial surveys flown over the Goodnews River and MFGR.

Salmon escapement objectives for the MFGR were established in 1983 as ranges at the MFGR counting tower (Schultz 1984b). These ranges were set at 3,000 to 4,000 chinook, 35,000 to 45,000 sockeye, and 13,000 to 18,000 chum salmon (Schultz, 1984b). No escapement objectives existed for coho salmon as the project normally ceased operation in mid-August. In 1989, the sockeye salmon escapement objective range was lowered to 20,000 to 30,000 fish. An evaluation of the sockeye salmon exploitation rate in previous years indicated that historical harvest levels could be maintained with a reduced escapement objective (Burkey, 1990). These ranges remained in place when the tower was replaced with the fixed picket weir in 1991.

In 1993, Biological Escapement Goals (BEGs) for chinook, sockeye, and chum salmon were established for the MFGR weir in 1993 (Francisco et al. 1992, Buklis 1993). These BEGs were set as the midpoints of the MFGR tower escapement objective ranges: 3,500, 25,000, and 15,000 for chinook, sockeye, and chum salmon, respectively. No BEG has been established for coho salmon for the MFGR weir, because insufficient historical escapement and run timing data exists. In 1997, operation of the MFGR weir was extended into September to monitor coho salmon escapement and run-timing. The project continues to add coho salmon data to the long term data base, which should lead to the establishment of a BEG for the MFGR weir.

Chinook salmon runs have reached their escapement goal at the MFGR weir only 4 times since 1991 (Table 5). In response, beginning in 1997, the Department delayed the opening of the District W-5 commercial salmon fishery until the last week in June to increase chinook salmon escapement into the drainage. Sockeye and chum salmon runs have reached escapement goals consistently since 1990 (Table 5).

Age, Sex, and Length

Annual escapement age, sex, and length (ASL) composition information is used to develop stock-recruitment models, which in turn provide information for projecting future run sizes. An historical listing of ASL for chinook, sockeye, coho, and chum salmon data collected at the MRGR weir and from the District W-5 commercial harvests can be found in Dubois and Folletti (2002).

Chinook salmon escapement ASL data has been collected at both the MFGR project and from the District W-5 commercial harvest since 1990 (Dubois and Folletti 2002). Since then, 63 % of the chinook salmon return to the MFGR as males, and 56 % of the chinook salmon harvested in the

District W-5 commercial fishery are male. Chinook salmon returning to the MFGR have been comprised mostly (43%) of age-1.4 fish, while 27 and 26 % return as age-1.3 and 1.2 fish, respectively. The mean lengths of the age-1.4 fish have been 865 and 858 mm, males and females, respectively. Chinook salmon harvested in the District W-5 commercial fishery have been primarily (45 %) age-1.3 fish, with 30 % being age-1.4 fish, and 23 % being age-1.2 fish. The mean lengths of age-1.4 fish have been 843 and 855 mm, males and females, respectively.

Sockeye salmon escapement ASL data has been collected at the MFGR project since 1984, and from the District W-5 commercial harvest since 1985 (Dubois and Folletti 2002). Since then, 50 % of the sockeye salmon returning to the MFGR are males. Sockeye salmon returning to the MFGR have been comprised mostly (75 %) of age-1.3 fish. The mean lengths of age-1.3 fish have been 581 and 547 mm, males and females, respectively. Since 1985, 54 % of the sockeye salmon harvest in District W-5 are male, the harvest being comprised primarily (73 %) of age-1.3 fish. Mean lengths of age-1.3 fish have been 594 and 562 mm, males and females, respectively.

Chum salmon escapement age and sex data has been collected at the MFGR project since 1990 and length data has been collected since 1995 (Dubois and Folletti 2002). Since then, 52 % of the chum salmon have returned as males. Chum salmon returning to the MFGR have been comprised mostly of age 0.3 fish (68 %) and age-0.4 fish (31 %). Since 1995, the means lengths of age-0.3 fish have been 593 and 561 mm, males and females, respectively, and for age-0.4 fish, 619 and 581 mm, males and females, respectively. Since 1984, ASL has been collected from chum salmon harvested in District W-5. Since then, chum salmon harvested in the district have been primarily female (51 %), with the total harvest having been comprised mostly (51 %) of age-0.3 and age-0.4 (49 %) fish. Mean lengths of age-0.3 fish have been 591 and 567 mm, males and females, respectively. Mean lengths of age-0.4 fish have been 612 and 583 mm, males and females, respectively.

Coho salmon escapement age and sex data has been collected at the MFGR project since 1991, and length data has been collected at the project since 1995 (Dubois and Folletti 2002). Since 1991, 49 % of the coho salmon return to the MFGR as males. Coho salmon returning to the MFGR have been comprised mostly (91 %) of age-2.1 fish. Since 1995, the mean lengths of age-2.1 fish have been 594 and 597 mm, males and females, respectively. Age and sex data has been collected from the District W-5 commercial harvest since 1990, and length data has been collected since 1996. Since 1990, 52 % of the coho salmon harvested in District W-5 have been male, and 89 % of the total harvest was made up of age-2.1 fish. Since 1996, the mean lengths of age-2.1 fish have been 616 and 609 mm, males and females, respectively.

Aerial Surveys

Aerial surveys have been used to assess salmon abundance in the Goodnews drainage since 1980. Aerial surveys for chinook, sockeye, and chum salmon were flown consistently from 1980 until 1989. Since then, surveys have been flown sporadically (i.e. only four aerial surveys have been flown over the MFGR for chinook salmon since 1990; Table 6).

Aerial escapement objectives for chinook, sockeye, chum, and coho salmon were established in 1993 for the Goodnews River and lakes, and the Middle Fork Goodnews River and Lakes (Buklis 1993). Aerial survey escapement objectives for the Goodnews River and lake are set at 1,600 chinook, 15,000 sockeye and 17,000 chum, and 15,000 coho (Buklis 1993). Aerial survey escapement objectives for Middle Fork Goodnews River and lakes are set at 800 chinook, 5,000 sockeye, 4,000 chum, and 2,000 coho salmon (Buklis 1993). Aerial survey data for all species has been sporadic since 1991, making it difficult to base any conclusions on abundance trends from survey results.

Objectives

The 2000 and 2001 objectives for the Middle Fork Goodnews River weir were to:

- successfully install and operate the weir from mid-June through September,
- enumerate the daily passage of all fish species through the weir,
- characterize the run-timing of chinook, sockeye, chum, and coho salmon through the weir,
- collect samples from chinook, sockeye, chum, and coho salmon at the weir for age-sex-length (ASL) determination,
- collect samples from chinook, sockeye, chum, and coho salmon from the District W-5 commercial harvest for ASL determination,
- enumerate the carcasses of all fish species washed up on the weir,
- record daily environmental and hydrological conditions at the weir site.

METHODS

Resistance Board Weir

For both the 2000 and 2001 field seasons, methods for the design, construction, and installation of the resistance-board floating weir largely follow those described in Tobin (1994). The 130 ft (39.6 m) weir used at the MFGR site was comprised of four major parts: the resistance board panel section, the fixed panel sections, the fixed picket sections, and the substrate rail.

The 65 ft (19.8 m) resistance board panel section was comprised of 4 ft (1.22 m) wide and 20 ft (6.10 m) long resistance board panels constructed out of 18 PVC Schedule 40 pipes (1 in diameter) with 2 ft (.61 m) by 4 ft (1.22 m) resistance boards attached to the downstream edge. The resistance board panels were anchored to the substrate rail by two hooks attached to a cable on the rail. The substrate rail was anchored to the stream bottom with metal stakes and duckbill anchors.

The resistance board panel section was bracketed by two fixed panel sections which consisted of five wooden tripods, composed of three beams, 4 in (10.16 cm) by 6 in (15.24 cm), and a small wooden platform approximately 2 ft (60.96 cm) below the intersection of the beams. These sections extend from the north bank to the beginning of the resistance-board weir (approximately 50 ft). On the left bank, two tripods were used. Sandbags were placed on the tripod platform to provide stability against the current. Two 3 in (7.62 cm) diameter x 10 ft (3.05 m) aluminum pipes were positioned to span the distance between the front legs of adjacent tripods. Weir panels consisting of 15 aluminum pipes (pickets) 1 in (2.54 cm) in diameter, and measured 2 ft 6 in (0.76 m) wide by 6 ft 8 in (2.03 m) in length were then positioned to rest on the upstream surface of the aluminum pipe.

The fixed panel sections were attached to each bank by fixed-picket sections of fixed-picket panels 2-3 ft long, and extended from the bank to the fixed-panel weir on each side of the river. One tripod was used with two horizontal aluminum bars with holes placed across the tripod to allow individual pipes to be placed through. The aluminum bars were secured to shore and individual pipes (1 in diameter) were slid through the bar holes.

A passage shoot was placed at approximately the middle of the resistance-board, floating section. To aid the species identification of salmon in turbid water, aluminum panels were placed on the substrate directly in front of the passageshoot on the up-river side. A live trap box was placed adjacent to the south bank. A fixed picket section was modified to provide a passage gate that allowed fish to enter the live trap box.

Escapement

2000

To determine escapement at the MFGR weir, fish passage counts were made daily from July 2 through September 22. During passage counts, the passage shoot gate was opened to pass fish through the weir. Crewmembers identified and enumerated the fish as they moved through. Passage counts occurred regularly throughout the day, typically for 1-2 hour periods, beginning in the morning and continuing as late as light permitted. Substantial delays in fish passage occurred only at night or during ASL sampling.

Chinook, sockeye, and chum salmon escapements in the Goodnews River were estimated by dividing their 2000 MFGR weir escapements by their respective average ratios (1981-1989) of MFGR escapement to Goodnews River escapement (Table 5). These ratios were 0.47, 0.49, and 0.41 for chinook, sockeye, and chum salmon, respectively.

2001

To determine escapement at the MFGR weir, fish passage counts were made daily from June 26 through September 30. During passage counts, the passage shoot gate was opened to pass fish

through the weir. Crewmembers identified and enumerated the fish as they moved through. Passage counts occurred regularly throughout the day, typically for 1-2 hour periods, beginning in the morning and continuing as late as light permitted. Substantial delays in fish passage occurred only at night or during ASL sampling.

To estimate chinook, sockeye, and chum salmon escapements in the Goodnews River, aerial survey counts from the Goodnews River were divided by the MFGR weir index. The MFGR weir index is the ratio of the number of fish observed during the aerial survey of the MFGR to the cumulative number of fish having passed the MFGR weir to that date. The resulting Goodnews River estimate was adjusted to account for the estimated percentage of the run that reached the spawning ground after the survey was flown. The percentage used was the portion of the respective runs that passed the MFGR weir after the survey was flown.

Age, Sex, and Length

For 2000 and 2001, escapement sampling was conducted based on the pulse sampling design of Molyneaux and DuBois (1999). The sampling objective for chinook salmon escapement was 4-5 strata (pulses) of 210 fish each, distributed equally over the run. Objectives for sockeye and chum salmon were a minimum of 6 pulses of 210 and 200 fish each, respectively, distributed equally over their runs. The objective for coho salmon was 3 pulses of 170 fish each, distributed equally over the run. Each pulse sample was used to estimate the ASL composition of the run at a given point of time during the run. A weighted mean, based on relative fish passage during each defined pulse as the weight, was used to estimate age composition of the total season passage.

To obtain salmon for escapement ASL sampling, a gate on the live trap was opened for a period of time to allow a sufficient number fish to enter. The live trap gate was closed and individual salmon were removed from the trap using a dip net. To sample salmon from the commercial harvest, fish were obtained from the processor. For both escapement and harvest ASL data collection, fish were measured for length (from the mid-eye to fork of tail). Escapement samples were sexed by examination of external characteristics. Harvest samples were sexed by making a small incision (approx. 1 in) anterior to the anus and then checking for the presence of eggs in the body cavity. For both escapement and commercial harvest samples, scales were removed (3 scales each from chinook, chum, and coho salmon, one scale from sockeye salmon) from the left side of the fish, approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963, DuBois and Molyneaux 2001). After escapement sampling was complete, fish were released on the upriver side of the weir. Scales were arranged on gum cards in the field and sent to the Bethel office for processing. Impressions from the gum cards were made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). Ages of the salmon were determined by examining the scale impressions (Mosher 1968) and recorded in European notation (Koo 1962).

Aerial Surveys

2000

No aerial surveys were flown in 2000.

2001

An aerial survey for chinook, sockeye, and chum salmon was flown over the Goodnews River and the Middle Fork Goodnews River on August 3. The survey was flown in a Cessna-185 at an altitude of 500 ft. Conditions were classified as fair. An aerial survey was not flown for coho salmon because of poor weather conditions and an aircraft was unavailable.

Weir Maintenance, Cleaning, and Mortality Counts

In 2000 and 2001, the weir was cleared of debris and fish carcasses daily. At each cleaning, fish carcasses were enumerated and identified by species. The weir was checked frequently for damage and repairs were made as needed.

Atmospheric and Hydrological Monitoring

2000

Water level (standardized to an established benchmark height), precipitation, air and water temperature, percent cloud cover, and cloud ceiling height were recorded twice daily at the weir site from June 10 through September 23.

2001

Water level (standardized to an established benchmark height), precipitation, air and water temperature, percent cloud cover, and cloud ceiling height were recorded twice daily at the weir site from June 15 through September 30.

RESULTS

Resistance Board Floating Weir

2000

The weir was operated from July 2 until September 22. Installation of the weir was delayed by nearly two weeks because of high water level throughout the month of June.

2001

In 2001, the weir was operational from June 26th through September 30th. Installation of the weir was delayed by about a week because of high water level mid-June. Additional funding allowed the weir to operate through the end of September, the latest date the project has operated.

Salmon Fisheries

2000

The 2000 commercial harvest was 4,442 chinook, 37,252 sockeye, 7,450 chum, 15,531 coho, and 7 pink salmon, for a total of 64,682 fish. Harvests were below their most recent 10-year averages for all species except chinook salmon (Table 1). The total harvest was 20 % below the most recent 10-year average (1990-99) of 80,304 fish. The exvessel value of the 2000 commercial harvest was \$213,014, more than double the exvessel value of \$103,662 in 1999, and 31 % below the most recent (1990-99) 10-year average of \$290,404 (Table 3).

A total of 46 permits fished the district in 2000, 37 % less than the 73 permits that fished in 1999, and 46 % below the most recent (1990-99) 10-year average of 81 permits (Table 2). The 25 periods in 2000 was 25 % more than the 20 periods in 1999, and one period less than the most recent (1990-99) 10-year average of 26 (Table 2). The 300 hrs of fishing time in 2000 was a 25 % increase over 1999 while being 14 % below the most recent (1990-99) 10-year average of 340 hrs (Table 2).

The estimated 2000 subsistence harvest was 601 chinook, 1,028 sockeye, 280 chum, and 414 coho salmon (Table 4). The sport fish harvest was 243 chinook, 82 sockeye, 795 coho, and 12 chum salmon. The commercial and subsistence fishery exploitation rate of the 2000 run was 34% for chinook, 25% for sockeye, and 13% for chum salmon (Table 5). No estimate for the exploitation of the 2000 coho salmon run was made because of the lack of escapement data for the Goodnews River.

2001

The 2001 commercial harvest was 1,519 chinook, 25,654 sockeye, 9,275 coho, and 3,412 chum salmon, for a total of 39,860 fish (Table 1). Harvests were below the most recent 10-year averages for all species. The total harvest was 39 % below the 2000 harvest and 50 % below the most recent

(1991-2000) 10-year average of 78,884 fish. The exvessel value of the 2001 commercial harvest was \$98,849, 54 % less than the exvessel value of \$213,014 in 2000, and 64 % less than the most recent (1991-2000) 10-year average of \$290,404 (Table 3).

A total of 32 permits fished the district in 2001, 31 % less than the 46 permits that fished in 2000, and 61 % less than the most recent (1991-2000) 10-year average of 81 (Table 2). The 16 periods in 2001 was 35 % less than the 25 periods in 2000, and 39 % less than the most recent (1991-2000) 10-year average of 26 periods (Table 2). There were 183 hrs of fishing time in 2001, a 39 % decrease from 2000, and 47 % below the most recent (1991-2000) 10-year average of 340 hrs (Table 2).

The estimated 2001 subsistence harvest was 853 chinook, 914 sockeye, 181 chum, and 506 coho salmon (Table 4). Sport fishing data was not available at the time of this writing. The commercial and subsistence exploitation of the 2001 run was 14 % for chinook, 14 % for sockeye, and 6 % for chum salmon (Table 5). No estimate for the exploitation of the 2001 coho salmon run was made because of the lack of escapement data for the Goodnews River.

Escapement

2000

Salmon escapement at the Middle Fork Goodnews River weir was 2,500 chinook, 32,341 sockeye, 2,530 pink, 19,676 coho, and 13,803 chum salmon (Table 6). Both chinook and chum salmon escapements failed to achieve their escapement goals of 3,500 and 15,000 fish, respectively. Sockeye salmon achieved its escapement goal of 25,000 fish. Twenty-four percent of the chinook, 23 % of the sockeye, and 6 % of the chum salmon runs were estimated to have passed the weir before operation because of the late starting date for weir operation based on historic run timing data at the weir (Table 7). Adding these estimates into the MFGR weir counts, estimated escapements were 3,295 chinook, 42,197 sockeye, and 4,720 chum salmon (Table 5).

In the absence of aerial survey data in 2000, the average ratio (determined from 1981-1989) of MFGR escapement to Goodnews River escapement was used to estimate chinook, sockeye, and chum salmon escapement in the Goodnews River. The ratios used were 0.47, 0.49, and 0.41 for chinook, sockeye, and chum salmon respectively, giving estimated escapements of 7,011 chinook, 86,116 sockeye, and 35,902 chum salmon (Table 5). Drainage wide escapement (Middle Fork Goodnews River escapement plus estimated Goodnews river escapement) estimates were 10,306 chinook, 128,313 sockeye, and 50,195 chum salmon.

Migration timing curves were plotted for chinook, sockeye, coho, and chum salmon (Figures 3-6). For chinook, sockeye, and chum salmon, a normal run timing curve (based on historic run timing data since 1981) was also plotted for comparison. Only 3 previous years of complete coho salmon run timing data exists, thus a normal run timing curve was not included in that plot. Both

chinook and sockeye salmon run timings appeared late, and chum salmon run timing was normal when compared to historic normal run timing.

2001

Salmon escapement at the MFGR weir was 5,351 chinook, 21,024 sockeye, 19,626 coho, 26,829 chum, and 1,328 pink salmon (Table 8). Chinook salmon exceeded its escapement goal of 3,500 fish by 35 %, while chum salmon exceeded its escapement goal of 15,000 by 45 %. Sockeye salmon failed to reach its escapement goal of 25,000 fish by 10 %. One percent of the chinook, and 7 % of the sockeye salmon runs were estimated to have passed the weir before operation because of the late starting date for weir operation based on historic run timing data at the weir (Table 7). Adding these estimates into the MFGR weir counts, the estimated chinook and sockeye salmon escapements at the MFGR weir were 5,404 and 22,495 fish, respectively.

Aerial survey counts for the Goodnews River were 3,561 chinook, 29,340 sockeye, and 7,330 chum salmon (Table 8). The MFGR index was 46 %, 22 %, and 24 %, chinook, sockeye, and chum salmon respectively. Expanding the Goodnews River aerial surveys counts by the MFGR index gives escapement estimates of 7,741 chinook, 133,364 sockeye, and 30,542 chum salmon. Accounting for the percentage of the run having reached the spawning grounds after the survey was flown (5, 3, and 11% for chinook, sockeye, and chum salmon, respectively), estimated Goodnews River escapement was 8,128 chinook, 137,364 sockeye, and 33,902 chum salmon. Drainage wide escapement estimates were 13,532 chinook, 159,859 sockeye, and 60,731 chum salmon.

Migration timing curves were plotted for chinook, sockeye, coho, and chum salmon (Figs. 7-10). For chinook, sockeye, and chum salmon, a normal run timing curve (based on historic run timing data since 1981) was also plotted for comparison. Only 4 previous years of complete coho salmon run timing data exists, thus a normal run timing curve was not included in that plot. Both the chinook and chum salmon run timings appeared late, and sockeye salmon run timing was normal when compared to historic normal run timing.

Age, Sex, and Length

2000 Escapement

Chinook: A total of 214 chinook salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for chinook salmon sampled were 68 % males and 32 % females with 63.9 % being age-1.3 fish (Table 9). The mean lengths for age 1.3 males and females were 722 mm and 786 mm, respectively (Table 10).

Sockeye: A total of 607 sockeye salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for sockeye salmon

sampled were 45.9 % male and 54.1 % female, with 91.2 % being age-1.3 fish (Table 11). The mean lengths for age 1.3 males and females were 578 mm and 547 mm, respectively (Table 12).

Chum: A total of 418 chum salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. No season estimate of age, sex, or length composition was made (Tables 13, 14).

Coho: A total of 419 coho salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for coho salmon sampled were 51.9% male and 48.1 % female, with 97.9 % being age-2.1 fish (Table 15). The mean lengths for age 2.1 males and females were 592 mm and 598 mm, respectively (Table 16).

2000 Commercial Harvest

Chinook: A total of 376 chinook salmon were sampled for ASL data from the commercial catch in District W-5 (Goodnews Bay). The estimated ASL compositions for 2000 District W-5 commercial chinook salmon catch samples were 48.3 % males and 51.7 % females, with 58.4 % being age-1.3 fish (Table 17). The mean lengths for males and females in the 1.3 age class were 669 and 744 mm, respectively (Table 18).

Sockeye: A total of 715 sockeye salmon were sampled for ASL data from the commercial catch in District W-5 (Goodnews Bay). The estimated ASL compositions for 2000 District W-5 commercial sockeye salmon catch samples were 59.8 % males and 40.2 % females, with 82.1 % being age-1.3 fish (Table 19). The mean lengths for males and females in the 1.3 age class were approximately 590 and 564 mm, respectively (Table 20).

Chum: A total of 598 chum salmon were sampled for ASL data from the commercial catch in District W-5 (Goodnews Bay). The estimated ASL compositions for 2000 District W-5 commercial chum salmon catch samples were 39.6 % males and 60.4 % females, with 57.1 % being age-0.4 fish (Table 21). The mean lengths for males and females in the 0.3 age class were approximately 628 and 598 mm, respectively (Table 22).

Coho: A total of 439 coho salmon were sampled for ASL data from the commercial catch in District W-5 (Goodnews Bay). The estimated ASL compositions for 2000 District W-5 commercial coho catch samples were 47.9 % males and 52.1 % females, with 97.6 % being age-2.1 fish (Table 23). The mean lengths for males and females in the 2.1 age class were approximately 602 and 596 mm, respectively (Table 24).

2001 Escapement

Chinook: A total of 39 chinook salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for chinook salmon sampled were 53.8 % male and 46.2 % female, with 71.8 % being age-1.4 fish (Table 25). The mean lengths for age 1.3 males and females were 823 mm and 851 mm, respectively (Table 26).

Sockeye: A total of 432 sockeye salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for sockeye salmon sampled were 51.1 % male and 48.9 % female, with 79.2 % being age-1.3 fish (Table 27). The mean lengths for age 1.3 males and females were 593 mm and 551 mm, respectively (Table 28).

Chum: A total of 768 chum salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated age compositions for chum salmon sampled were 44.5 % male and 55.5 % female, with 70.6 % being age-0.3 fish (Table 29). The mean lengths for age 0.3 males and females were 595 mm and 566 mm, respectively (Table 30).

Coho: A total of 439 coho salmon were sampled for ASL data for the Middle Fork Goodnews River escapement project. The estimated ASL compositions for coho salmon sampled were 49.4 % male and 50.6 % female, with 89 % being age-2.1 fish (Table 31). The mean lengths for age 2.1 males and females was 613 mm (Table 32).

2001 Commercial Harvest

Chinook: A total of 262 chinook salmon were sampled for ASL data from the District W-5 commercial harvest. The estimated ASL compositions for chinook salmon sampled were 39.9 % males and 60.1 % females with 63.1 % being age-1.4 fish (Table 33). The mean lengths for age 1.4 males and females were 821 and 853 mm, respectively (Table 34).

Sockeye: A total of 576 sockeye salmon were sampled for ASL data from the District W-5 commercial harvest. The estimated ASL compositions for sockeye salmon sampled were 49 % males and 51 % females with 90.3 % being age-1.3 fish (Table 35). The mean lengths for age 1.3 males and females were 601 and 565 mm, respectively (Table 36).

Chum: A total of 647 chum salmon were sampled for ASL data from the District W-5 commercial harvest. The estimated age compositions for chum salmon sampled were 38.6 % males and 61.4 % females with 56.9 % being age-0.3 fish (Table 37). The mean lengths for age 0.3 males and females were 593 and 568 mm, respectively (Table 38).

Coho: A total of 414 coho salmon were sampled for ASL data from the District W-5 commercial harvest. The estimated ASL compositions for coho salmon sampled were 52.6 % males and 47.4 % females, with 89.6 % being age-2.1 fish (Table 39). The mean lengths for age 2.1 males and females were 623 and 614 mm, respectively (Table 40).

Aerial Surveys

2000

No aerial surveys were flown in 2000.

2001

The MFGR aerial survey results were 2,799 chinook, 12,383 sockeye, and 6,945 chum salmon. Both sockeye and chum salmon failed to meet their MFGR aerial survey escapement objectives of 15,000 and 17,000 fish, respectively (Table 8). No coho salmon aerial survey was flown over the MFGR in 2001.

The Goodnews River aerial survey results were 3,561 chinook, 29,340 sockeye, and 7,330 chum salmon, all achieving their aerial escapement objectives of 800, 5,000, and 4,000 fish, respectively (Table 8). No coho salmon aerial survey was flown over the Goodnews River in 2001.

Mortality Counts

2000

No mortality counts are available for 2000.

2001

Mortality counts were 388 chinook, 511 sockeye, 5,776 chum, 516 pink, and 108 coho salmon.

Atmospheric and Hydrological Monitoring

2000

A complete listing of daily environmental conditions can be found in Table 41.

2001

A complete listing of daily environmental conditions can be found in Table 42.

DISCUSSION

In 2000 and 2001 the project continued its success in achieving its objectives by adding to the long-term salmon escapement, run timing, and ASL database for the MFGR. The resistance board, floating weir continues to demonstrate its ability to operate during periods of high water level. However, in both 2000 and 2001, installation was delayed because of high water. Future delays could be avoided by installing the weir earlier (mid-May), however this would result in a substantial increase in the annual operating cost of the project. In 2001, operation of the weir continued until September 30, the latest date the project has operated.

The 2000 commercial salmon harvest increased over the 1999 harvest, although the number of permits fishing the district dropped from 1999. This increase in harvest is likely the result of the even year dominance of coho salmon providing a greater abundance of coho salmon. The observed even-year dominance of coho salmon has been visible in the commercial harvest since 1996, as even year harvests, albeit below most recent 10-year average, have exceeded the historic average.

The 2001 commercial harvest was lower than the 2000 harvest, and was the third lowest since 1985. Although the decrease in harvest can be attributed to the reduction in effort, the reduction in fishing opportunity in 2001 was likely the primary factor. Limited processing capacity limited the fishing schedule to two 12-hour periods a week for most of the 2001 commercial season (the district only fished a three 12-hour period a week schedule during the last two weeks of the season). In addition, the single buyer in the district ceased operations from July 23 until August 1 in response to a decline in the quality of sockeye salmon. More over, sockeye salmon escapement concerns at the MFGR weir resulted in the canceling of one period in mid-July. Finally, no commercial harvests occurred during two scheduled periods because poor weather prevented tenders from reaching the district.

Overall, since 1996, the trend in the commercial harvest has been below average, likely a result in the decrease in fishing effort since 1995. Since then, the trend in effort has been below both historical and most recent 10-year averages (with 1999 being the exception). This is likely attributable to the declining market for wild salmon since 1995, recent high fuel prices, and other economic opportunities in the area.

Chinook and chum salmon did not achieve their respective BEGs at the MFGR weir in 2000. Chinook salmon has reached its escapement goal only four times since 1990. The chinook salmon harvest is incidental to the sockeye and coho salmon harvests. The continued low chinook salmon returns prompted the Department, starting in 1996, to delay opening the District W-5 season until late June (the district typically opens prior to June 15) to increase chinook salmon escapement. In 2001 the Department continued to delay the District W-5 commercial opening (the district opened June 29), and chinook salmon exceeded its escapement goal at the MFGR weir by 36 %, the first time it has achieved its escapement goal since 1998. In 2000, chum salmon fell short of its escapement goal, however, in 2001, chum salmon exceeded its escapement goal at the MFGR weir by 44 %, although it did not meet its aerial escapement objective on the MFGR. Sockeye salmon

achieved its escapement goal at the MFGR weir in 2000, but failed to achieve its escapement goal of by 16 % in 2001, the first time since 1989. Likewise in 2001, sockeye salmon did not achieve its aerial survey escapement objective for the MFGR. However, the sockeye salmon escapement estimate for the Goodnews River was a record high, and the drainage wide estimate was the fifth highest recorded. Based on MFGR/Goodnews River sockeye salmon escapement ratios from 1983-1989, the average ratio is 0.47, ranging from 0.35 to 0.66. In 2001, it was 0.16. It is not clear whether the Goodnews River and Middle Fork Goodnews River sockeye salmon runs are separate stocks. The Department will be collecting genetic samples from sockeye salmon in the Goodnews River in 2002 in an attempt to answer this question. Only 5 years of complete coho salmon escapement data from the MFGR weir data exists, therefore no established BEG has been established. The observed late run timing by chinook and sockeye salmon in 2000 is likely a result of weir installation being delayed until July 2. An estimated 24 and 23 % of the chinook and sockeye salmon runs, respectively, passed the weir site prior to installation in 2000. Undoubtedly, the observed run timing would shift to the left if the portions of missed because of the delay in weir operation were taken into account.

For 2000 and 2001, the ASL sample size objectives for the MFGR weir were not attained for any species. However, sample sizes in both years were adequate to characterize the escapement age, sex, and length compositions, except for chinook salmon. In both 2000 and 2001, the numbers of chinook salmon sampled were well below the goal of 840-1,050 fish. Collecting adequate sample sizes of chinook salmon continues to be problematic. It has been observed that chinook salmon are hesitant to enter the live trap when numerous sockeye and chum salmon are present (Rob Stewart, ADF&G, personal communication). A potential solution to this problem is to place a second live trap box further out from the bank, which will provide an alternate trap for the chinook salmon to enter, assuming sockeye and chum salmon continue to primarily enter the live trap box nearest to the shore. The Department will attempt to procure funding for this additional live box in 2003.

In 2000, the 64 % of age-1.3 chinook salmon at the MFGR weir was the highest percent for that age class since 1990. Typically, since 1990, most chinook salmon sampled at the MFGR weir have been age-1.4 fish. Consistent with previous years, most chinook salmon sampled from the District W-5 commercial harvest in 2000 were age-1.3 fish. In 2001, most of the chinook salmon sampled at both the MFGR weir and in the District W-5 commercial harvest were age -1.4 fish. As with previous years, most of the sockeye salmon sampled in 2000 and 2001 from the MFGR weir and the District W-5 commercial harvest were age-1.3 fish. In 2000, ASL samples were not collected from the first quartile of the chum salmon run, thus a season total was not calculated. In 2001, most of the chum salmon run at the weir was comprised primarily of age-0.3 and 0.4 fish. In both years, as the season progressed, both runs showed the normal tendency for the proportion of age-0.4 fish to decrease as the proportion of age-0.3 fish increased. As with previous years, in both 2000 and 2001, most of the coho salmon sampled at the MFGR weir were age-2.1 fish.

LITERATURE CITED

- Buklis, L. 1993. Documentation of Arctic-Yukon-Kuskokwim Region salmon escapement goals in effect as of the 1992 fishing season. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A93-03, Anchorage.
- Burkey Jr., C. 1989. Goodnews River Fisheries Studies, 1988. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. 3B89-19, Bethel.
- Burkey Jr., C. 1990. Goodnews River Fisheries Studies, 1989. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. 3B90-16, Bethel.
- Clutter, R., and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. Bulletin of the International Pacific Salmon Fisheries Commission No. 9. Vancouver, British Columbia.
- DuBois, L., and D. Folletti. 2002. Salmon age, sex, and length catalog for the Kuskokwim Area, 2001 progress report tables. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Anchorage.
- Francisco, R.K., et al. 1992. Report to the Alaska Board of Fisheries, Kuskokwim Area, 1992. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A92-28, Anchorage.
- INPFC (International North Pacific Fisheries Commission). 1963. Annual Report, 1961. Vancouver, British Columbia.
- Koo, T. S. Y. 1962. Age designation in salmon. Pages 37-48 in T. S. Y. Koo, editor. Studies of Alaska red salmon. University of Washington Publications in Fisheries, New Series, Volume I, Seattle.
- Menard, J. 1998. Middle Fork Goodnews River Fisheries Studies, 1990 – 1997. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A98-30, Anchorage.
- Menard, J. 1999. Middle Fork Goodnews River Fisheries Studies, 1998. Alaska Department of Fish and Game, Commercial Fisheries Division, Regional Information Report No. 3A99-13, Anchorage.

- Molyneaux, D. B. and L. DuBois. 1999. Salmon age, sex, and length catalog for the Kuskokwim area, 1998 progress report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 3A99-15, Anchorage.
- Mosher, K. 1968. Photographic atlas of sockeye salmon scales. Fishery Bulletin 67:243-280.
- Schultz, K. 1982. Goodnews River Tower Study, 1982. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Kuskokwim Salmon Escapement Report No. 24, Bethel.
- Schultz, K. 1984a. Goodnews River Counting Tower Study, 1983. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Kuskokwim Salmon Escapement Report No. 33, Bethel.
- Schultz, K. 1984b. Goodnews River Studies, 1984. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Kuskokwim Salmon Escapement Report No. 34, Bethel.
- Schultz, K. 1985. Goodnews River Studies, 1985. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Kuskokwim Salmon Escapement Report No. 38, Bethel.
- Schultz, K. 1987. Goodnews River Studies, 1986. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Kuskokwim Salmon Escapement Report No. 39, Bethel.
- Schultz, K. and C. Burkey, Jr. 1989. Goodnews River Fisheries Studies, 1987. Alaska Department of Fish and Game, Commercial Fisheries Division, AYK Region, Regional Information Report No. 3B89-02, Bethel.
- Tobin, J.H., III. 1994. Construction and performance of a portable resistance board weir for counting migrating adult salmon in rivers. Alaska Fisheries Technical Report Number 22. U.S. Fish and Wildlife Service, Kenai Fishery Resource Office, Kenai.

Table 1. Historical commercial salmon harvest, District W-5, 1968-2001.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1968			5,458			5,458
1969	3,978	6,256	11,631	298	5,006	27,169
1970	7,163	7,144	6,794	12,183	12,346	45,630
1971	477	330	1,771	0	301	2,879
1972	264	924	925	66	1,331	3,510
1973	3,543	2,072	5,017	324	15,781	26,737
1974	3,302	9,357	21,340	16,373	8,942	59,314
1975	2,156	9,098	17,889	419	5,904	35,466
1976	4,417	5,575	9,852	8,453	10,354	38,651
1977	3,336	3,723	13,335	29	6,531	26,954
1978	5,218	5,412	13,764	9,103	8,590	42,087
1979	3,204	19,581	42,098	201	9,298	74,382
1980	2,331	28,632	43,256	7,832	11,748	93,799
1981	7,190	40,273	19,749	11	13,642	80,865
1982	9,476	38,877	46,683	4,673	13,829	113,538
1983	14,117	11,716	19,660	0	6,766	52,259
1984	8,612	15,474	71,176	4,711	14,340	114,313
1985	5,793	6,698	16,498	8	4,784	33,781
1986	2,723	25,112	19,378	4,447	10,355	62,015
1987	3,357	27,758	29,057	54	20,381	80,607
1988	4,964	36,368	30,832	5,509	33,059	110,732
1989	2,966	19,299	31,849	82	13,622	67,818
1990	3,303	35,823	7,804	629	13,194	60,753
1991	912	39,838	13,312	29	15,892	69,983
1992	3,528	39,194	19,875	14,310	18,520	95,427
1993	2,117	59,293	20,014	0	10,657	92,081
1994	2,570	69,490	47,499	18,017	28,477	166,053
1995	2,922	37,351	17,875	39	19,832	78,019
1996	1,375	30,717	43,836	22	11,093	87,043
1997	2,039	31,451	2,983	0	11,729	48,202
1998	3,675	27,161	21,246	411	14,155	66,648
1999	1,888	22,910	2,474	0	11,562	38,834
2000	4,442	37,252	15,531	7	7,450	64,682
2001	1,519	25,654	9,275	0	3,412	39,860
10-year avg.	2,616	39,135	19,314	6553 ^a	14,778	78,884
Historic avg	3,867	23,969	20,580	6671 ^a	11,906	61,928

^a Average of even years only

Table 2. Historical commercial effort and opportunity, District W-5, 1970-2001.

Year	Number of periods	Fishing hours ^a	Effort ^b
1970	28	624	35
1971	3	156	16
1972	8	186	14
1973	24	288	21
1974	30	360	49
1975	24	288	50
1976	32	384	40
1977	24	288	34
1978	36	432	35
1979	36	432	30
1980	38	456	48
1981	34	492	48
1982	34	540	48
1983	28	336	79
1984	31	372	77
1985	22	264	69
1986	30	360	86
1987	21	252	69
1988	30	360	125
1989	28	336	88
1990	28	396	82
1991	27	432	72
1992	26	396	111
1993	28	336	114
1994	32	432	116
1995	25	396	118
1996	21	247	53
1997	23	276	54
1998	29	348	50
1999	20	240	73
2000	25	300	46
2001	16	183	32
10-year avg	26	340	81
Historic avg	27	355	63

^a Number of hours that fishing was open in the Goodnews Bay District.

^b Permits that made at least one delivery during the year.

Table 3. Historical commercial salmon exvessel value, District W-5, 1990-2001.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1990	\$32,135	\$263,598	\$38,910	\$254	\$25,767	\$360,664
1991	\$8,370	\$187,622	\$47,519	\$14	\$31,394	\$274,919
1992	\$30,688	\$257,457	\$75,278	\$2,913	\$39,111	\$405,447
1993	\$21,351	\$296,437	\$95,043	\$0	\$28,304	\$441,135
1994	\$21,732	\$309,577	\$271,687	\$5,442	\$41,309	\$649,747
1995	\$31,339	\$175,552	\$58,061	\$19	\$21,427	\$286,398
1996	\$5,952	\$87,427	\$120,191	\$4	\$9,015	\$222,589
1997	\$10,867	\$93,146	\$9,497	\$0	\$9,358	\$122,868
1998	\$13,685	\$100,171	\$59,102	\$174	\$11,133	\$184,265
1999	\$9,020	\$78,800	\$7,515	\$0	\$8,327	\$103,662
2000	\$25,614	\$146,708	\$34,689	\$2	\$6,001	\$213,014
2001	\$10,496	\$68,678	\$17,089	\$0	\$2,586	\$98,849
10-year avg	\$17,862	\$173,290	\$77,858	\$857	\$20,538	\$290,404

Table 4. Historical salmon subsistence harvest, Goodnews Bay area, 1967-2001

Year	Chinook	Sockeye	Chum	Coho
1967	1349			
1968	2756			
1969				
1970				
1971				
1972				
1973				
1974				
1975				
1976				
1977	574			
1978				
1979	228			
1980	498			
1981	1309			
1982	1185			
1983	1004			
1984	597			
1985	399	562	339	210
1986	513	860	188	
1987	640	834	371	
1988	289	898	405	1072
1989	419	710	620	830
1990	351	970	193	1556
1991	894	1132	144	1789
1992	318	669	921	1163
1993	628	784	188	1197
1994	712	669	425	435
1995	858	219	152	296
1996	403	411	214	293
1997	437	472	133	343
1998	713	483	285	312
1999	805	770	250	439
2000	601	1028	280	414
2001	853	914	181	506
10-year avg	637	664	299	668
Historic avg	744	729	311	724

Table 5. Historical estimated salmon run size and commercial exploitation rate, Goodnews River drainage, 1981-2001.

Year	Species	Middle Fork Tower/weir estimate	Middlefork Aerial Survey Count as a Percentage of Weir Est.	North Fork Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest	Goodnews Bay Commercial Estimate	Total Run Size	Exploitation ^a Rate (% of Run)
1981	Chinook	3,688	b	7,766 ^c	1,409	7,190	20,053	43
	Sockeye	49,108	b	100,029 ^c	3,511 ^d	40,273	192,921	23
	Chum	21,827	b	53,799 ^c	-	13,642	89,268	15
1982	Chinook	1,395	b	2,937 ^c	1,236	9,476	15,044	71
	Sockeye	56,255	b	114,587 ^c	2,754 ^d	38,877	212,473	20
	Chum	6,767	b	16,679 ^c	-	13,829	37,275	37
1983	Chinook	6,022	36	14,398	1,066	14,117	35,603	43
	Sockeye	25,813	22	69,955	1,518 ^d	11,716	109,002	12
	Chum	15,548	b	38,323 ^c	-	6,766	60,637	11
1984	Chinook	3,260	35	8,743	629	8,612	21,244	43
	Sockeye	32,053	27	67,213	964	15,474	115,704	14
	Chum	19,003	35	117,739	189	14,340	151,271	10
1985	Chinook	2,831	70	7,979	426	5,793	17,029	37
	Sockeye	24,131	11	50,481	704	6,698	82,014	9
	Chum	10,367	32	25,025	348	4,784	40,524	13
1986	Chinook	2,092	57	4,094	555	2,723	9,464	35
	Sockeye	51,069	28	93,228	942	25,112	170,351	15
	Chum	14,764	38	51,910	191	10,355	77,220	14
1987	Chinook	2,272	100	4,490	816	3,357	10,935	38
	Sockeye	28,871	85	51,989	955	27,758	109,573	26
	Chum	17,517	58	37,802	578	20,381	76,278	27
1988	Chinook	2,712	39	5,419	310	4,964	13,405	39
	Sockeye	15,799	30	38,319	1065	36,368	91,551	41
	Chum	20,799	21	39,501	448	33,059	93,807	36
1989	Chinook	1,915	67	2,891	467	2,966	8,239	42
	Sockeye	21,186	60	35,476	869	19,299	76,830	26
	Chum	10,380	28	15,495	760	13,622	40,257	36

-continued-

Table 5. (page 2 of 2)

Year	Species	Middle Fork Tower/Weir Estimate	Middle Fork Aerial Survey Count as a Percentage of Weir Est.	North Fork Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest	Goodnews Bay Commercial Harvest	Total Run Size	Exploitation ^a Rate (% of run)
1990	Chinook	3,636		^b 7,656 ^c	682	3,303	15,277	26
	Sockeye	31,679		^b 64,528 ^c	905	35,823	132,935	28
	Chum	6,410		^b 15,799 ^c	342	13,194	35,745	38
1991 ^c	Chinook	1,952		^b 4,521 ^c	682	912	8,067	20
	Sockeye	47,397		^b 96,544 ^c	900	39,838	184,679	22
	Chum	27,525		^b 67,844 ^c	106	15,892	111,367	14
1992	Chinook	1,903	61	1,854	252	3,528	7,537	50
	Sockeye	27,268	21	52,501	905	39,194	119,868	33
	Chum	22,023	19	16,084	662	18,520	57,289	33
1993	Chinook	2,349		^b 4,727 ^c	488	2,117	9,681	27
	Sockeye	26,452		^b 54,325 ^c	572	59,293	140,642	43
	Chum	14,952		^b 38,061 ^c	133	10,657	63,803	17
1994	Chinook	3,856		^b 7,866 ^c	657	2,570	14,949	22
	Sockeye	55,751		^b 115,405 ^c	652	69,490	241,298	29
	Chum	34,849		^b 91,653 ^c	402	28,477	155,381	
1995	Chinook	4,836		^b 9,865 ^c	552	2,922	18,175	19
	Sockeye	39,009		^b 80,749 ^c	787	37,351	157,896	24
	Chum	33,699		^b 88,628 ^c	329	19,832	142,488	14
1996	Chinook	2,930		^b 5,977 ^c	526	1,375	10,808	18
	Sockeye	58,264		^b 120,606 ^c	763	30,717	210,350	15
	Chum	40,450		^b 106,384 ^c	326	11,093	158,253	7
1997	Chinook	2,937	51	7,216	449	2,039	12,641	20
	Sockeye	35,530	57	23,462	609	31,451	91,052	35
	Chum	17,296	^b	45,488 ^c	133	11,729	74,646	16

-continued-

Table 5. (page 3 of 3)

Year	Species	Middle Fork Tower/Weir Estimate	Middle Fork Aerial Survey Count as a Percentage of Weir Est.	North Fork Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest	Goodnews Bay Commercial Harvest	Total Run Size	Exploitation ^a Rate (% of run)
1998	Chinook	4,584		18	3,797	718	12,774	34
	Sockeye	47,951		25	14,693	508	90,313	31
	Chum	28,905		15	24,940	316	68,316	21
1999	Chinook	3,221		^b	6,565 ^c	871	12,545	22
	Sockeye	48,205		^b	99,727 ^c	872	171,714	14
	Chum	19,533		^b	51,361 ^c	281	82,737	14
2000	Chinook	3,295		^b	6,458 ^c	601	14,796	34
	Sockeye	42,197		^b	73,845 ^c	1,028	154,322	25
	Chum	14,720		^b	35,475 ^c	280	57,925	13
2001	Chinook	5,404		46	8,128	853	16,504	14
	Sockeye	22,495		61	137,364	914	186,427	14
	Chum	26,829		24	33,902	181	64,324	6

^a Commercial and subsistence exploitation.

^b Incomplete aerial survey results.

^c Average Middle Fork/Goodnews River escapement estimate ratio for 1983-1989 used to estimate Goodnews River . escapement in years with no aerial survey data.

^d Subsistence caught chum salmon is included in subsistence sockeye salmon harvest.

^e Goodnews Tower Project changed to weir project in 1991.

Table 6. Historical salmon escapement at the Middle Fork Goodnews River project, 1981-2000.

Year	Operating period ^a	Chinook	Sockeye	Coho ^b	Pink	Chum
1981	June 13 - Aug 15	3,688	49,108	356	1,327	21,827
1982	June 23 - Aug 03	1,395	56,255	91	13,855	6,767
1983	June 11 - July 28	6,027	25,813	0	34	15,548
1984	June 15 - July 31	3,260	32,053	249	13,744	19,003
1985	June 27 - July 31	2,831	24,131	282	144	10,367
1986	June 16 - July 24	2,080	51,069	163	8,133	14,764
1987	June 22 - July 30	2,272	28,871	62	62	17,517
1988	June 23 - July 30	2,712	15,799	6	6,781	20,799
1989	June 29 - July 31	1,915	21,186	1212	246	10,380
1990	June 20 - July 24	3,636	31,679	0	3,378	6,410
1991	June 29 - Aug 25	1,952	47,397	1,978	1,694	27,525
1992	June 21 - Aug 16	1,903	27,268	150	23,030	22,023
1993	June 22 - Aug 18	2,317	26,244	1,374	318	14,472
1994	June 22 - Aug 16	3,856	55,751	309	38,705	34,849
1995	June 19 - Aug 28	4,836	39,009	5,415	330	33,669
1996	June 18 - Aug 23	2,930	58,264	9,699	20,105	40,450
1997	June 12 - Sept 17	2,937	35,530	9,611	940	17,296
1998	July 04 - Sept 17	3,093	32,811	34,441	10,376	25,783
1999	June 25 - Sept 26	3,221	48,198	11,545	914	19,533
2000	July 02 - Sept 22	2,500	32,341	19,676	2,530	13,803
2001	June 26 -Sept 30	5,351	21,024	19,626	1,328	26,829

^a In years where the weir became inoperable in season due to high water, interpolation was used to estimate escapement for the time period missed.

^b The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, 1999, 2000, and 2001). No interpolation was attempted in 1992 or 1994 because of flooding.

Table 7. Percentage of salmon escapement estimated at the Middle Fork Goodnews River project, 1991-2000.

Year	Operating period ^a	Chinook	Sockeye	Coho ^b	Pink	Chum
1991	June 29 - Aug 25	0	15	0	0	2
1992	June 21 - Aug 16	29	43	0	3	15
1993	June 22 - Aug 18	14	22	0	0	8
1994	June 22 - Aug 16	20	16	0	0	20
1995	June 19 - Aug 28	0	0	0	0	0
1996	June 18 - Aug 23	26	24	11	28	27
1997	June 12 - Sept 17	2	1	0	0	8
1998	July 04 - Sept 17	32	32	3	0	11
1999	June 25 - Sept 26	0	0	0	0	0
2000	July 02 - Sept 22	24	23	0	0	6
2001	June 26- Sept 30	1	7	0	0	0

^a Estimates were made for some species when the weir was not operational from June 15 through . August 16. Previous to 1991 the project was a counting tower and the majority of the escapement was estimated based on a systematic counting schedule.

^b The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, 1999, 2000, and 2001). In 1999 the weir was out for 10 days in early August because of flooding.

Table 8. Aerial survey results, Goodnews River drainage, 1980- 2001.

Year	Middle Fork Goodnews River and Lake				Goodnews River and lakes			
	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho
1980	1,228	75,639	1,975	a	1,164	18,926	3,782	a
1981	a	a	a	a	a	a	a	a
1982	1,990	19,160	9,700	a	1,546	2,327	6,300	a
1983	2,600	9,650	a	a	2,500	5,900	a	a
1984	3,245	9,240	17,250	43,925	1,930	12,897	9,172	a
1985	3,535	2,843	4,415	a	2,050	5,470	3,593	a
1986	1,068	8,960	11,850	a	1,249	16,990	7,645	a
1987	2,234	19,786	12,103	11,122	2,222	34,585	9,696	a
1988	637	5,820	3,846	a	1,024	5,831	5,814	a
1989	651	3,605	a	a	1,277	8,044	2,922	a
1990	626	27,689	a	a	a	a	a	a
1991b	a	a	a	a	a	a	a	a
1992	875	10,397	1,950	a	1,012	7,200	3,270	a
1993	a	a	a	a	a	a	a	a
1994	a	a	a	a	a	a	a	a
1995	3,314	a	a	a	a	a	a	a
1996	a	a	a	a	a	a	a	a
1997	3,611	12,610	a	a	1,447	19,843	a	a
1998	578	3,497	2,743	a	731	11,632	3,619	a
1999	a	a	a	a	a	a	a	a
2000	a	a	a	a	a	a	a	a
2001	2,799	12,383	6,945	a	3,561	29,340	7,330	a
Objective c	1,600	15,000	17,000	800	800	5,000	4,000	20,000

a Information not available.

b Survey past peak.

c Escapement objectives are preliminary and are subject to change as additional data becomes available.

Escapement objectives are based on aerial index counts, which do not represent total escapement, but do reflect annual spawner abundance trends when made using standard survey methods under acceptable survey conditions.

Table 9. Age and sex of chinook salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000.

Sample Dates	Sample Size	Sex	Age class										Total	
			1.1		1.2		1.3		1.4		1.5			
			Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
7/5, 7-10 (7/2-11)	58	M	15	1.7	150	17.2	345	39.6	60	6.9	0	0.0	570	65.5
		F	0	0.0	0	0.0	180	20.7	120	13.8	0	0.0	300	34.5
		Subtotal	15	1.7	150	17.2	525	60.3	180	20.7	0	0.0	870	100.0
7/12-13, 15 (7/12-16)	70	M	0	0.0	69	10.0	303	44.3	108	15.7	0	0.0	480	70.0
		F	0	0.0	0	0.0	118	17.1	88	12.9	0	0.0	205	30.0
		Subtotal	0	0.0	69	10.0	421	61.4	196	28.6	0	0.0	685	100.0
7/18-20 (7/17 - 22)	31	M	14	3.2	41	9.7	217	51.6	27	6.5	0	0.0	298	71.0
		F	0	0.0	0	0.0	81	19.4	27	6.4	14	3.2	122	29.0
		Subtotal	14	3.2	41	9.7	298	71.0	54	12.9	14	3.2	420	100.0
7/24, 27 (7/23-9/21)	55	M	0	0.0	39	7.3	266	49.1	49	9.1	10	1.8	364	67.3
		F	0	0.0	0	0.0	98	18.2	79	14.5	0	0.0	177	32.7
		Subtotal	0	0.0	39	7.3	364	67.3	128	23.6	10	1.8	541	100.0
Season	214	M	29	1.1	298	11.9	1,131	44.9	244	9.7	10	0.4	1,712	68.0
		F	0	0.0	0	0.0	477	19.0	314	12.5	13	0.5	804	32.0
		Total	29	1.1	298	11.9	1,608	63.9	558	22.2	23	0.9	2,516	100.0

Table 10. Mean length (mm) of chinook salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000.

Sample Dates (Stratum Dates)	Sex		Age class					
			0.2	1.1	1.2	1.3	1.4	1.5
7/5, 7-10 (7/2-11)	M	Mean Length		305	523	704	854	
		Std. Error		-	12	10	15	
		Range		305-305	470-585	600-780	810-875	
		Sample Size	0	1	10	23	4	0
	F	Mean Length				778	841	
		Std. Error				14	11	
		Range				705-855	805-890	
		Sample Size	0	0	0	12	8	0
7/12-13, 15 (7/12-16)	M	Mean Length			524	730	875	
		Std. Error			30	9	17	
		Range			440-635	655-850	745-940	
		Sample Size	0	0	7	31	11	0
	F	Mean Length				799	847	
		Std. Error				9	8	
		Range				750-860	810-890	
		Sample Size	0	0	0	12	9	0
7/18-20 (7/17 - 22)	M	Mean Length		385	442	721	808	
		Std. Error		-	33	13	8	
		Range		385-385	385-500	645-825	800-815	
		Sample Size	0	1	3	16	2	0
	F	Mean Length				791	830	990
		Std. Error				16	45	-
		Range				730-845	785-875	990-990
		Sample Size	0	0	0	6	2	1
7/24, 27 (7/23-9/21)	M	Mean Length			546	737	840	920
		Std. Error			29	11	13	-
		Range			490-615	654-855	810-875	920-920
		Sample Size	0	0	4	27	5	1
	F	Mean Length				782	834	
		Std. Error				20	15	
		Range				660-895	765-895	
		Sample Size	0	0	0	10	8	0
Season	M	Mean Length		343	515	722	855	920
		Range		343-343	385-635	600-855	745-940	920-920
		Sample Size	0	2	24	97	22	1
	F	Mean Length				786	840	990
		Range				660-895	765-895	990-990
		Sample Size	0	0	0	40	27	1

Table 11. Age and sex of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000

Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class												Total	
			0.3		1.2		1.3		2.2		1.4		2.3			
			Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
7/3, 4 (7/2-7)	184	M	71	0.5	0	0.0	5,154	39.7	71	0.6	71	0.5	353	2.7	5,718	44.0
		F	0	0.0	0	0.0	6,989	53.8	70	0.5	141	1.1	71	0.6	7,272	56.0
		Subtotal	71	0.5	0	0.0	12,143	93.5	141	1.1	212	1.6	424	3.3	12,990	100.0
7/10, 12 (7/8-14)	173	M	68	0.6	68	0.6	4,413	37.6	68	0.6	204	1.7	68	0.6	4,888	41.6
		F	204	1.7	271	2.3	6,110	52.0	204	1.7	0	0.0	68	0.6	6,857	58.4
		Subtotal	272	2.3	339	2.9	10,523	89.6	272	2.3	204	1.7	136	1.2	11,745	100.0
7/17, 18 (7/15-22)	162	M	50	1.3	75	1.9	1,790	44.5	0	0.0	50	1.2	149	3.7	2,113	52.5
		F	25	0.6	149	3.7	1,640	40.7	50	1.2	0	0.0	50	1.2	1,914	47.5
		Subtotal	75	1.9	224	5.6	3,430	85.2	50	1.2	50	1.2	199	4.9	4,027	100.0
7/28-30 7/23-9/22	88	M	0	0.0	0	0.0	2,155	55.7	0	0.0	0	0.0	88	2.3	2,243	58.0
		F	0	0.0	88	2.3	1,495	38.6	0	0.0	0	0.0	44	1.1	1,627	42.0
		Subtotal	0	0.0	88	2.3	3,650	94.3	0	0.0	0	0.0	132	3.4	3,870	100.0
Season	607	M	188	0.6	142	0.4	13,511	41.4	138	0.4	324	1.0	658	2.0	14,962	45.9
		F	229	0.7	509	1.6	16,235	49.8	324	1.0	141	0.4	232	0.7	17,670	54.1
		Total	417	1.3	651	2.0	29,746	91.2	462	1.4	465	1.4	890	2.7	32,632	100.0

Table 12. Mean length (mm) of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000.

Sample Dates (Stratum Dates)	Sex		Age class					
			0.3	1.2	1.3	2.2	1.4	2.3
7/3, 4 (7/2-7)	M	Mean Length	570		582	495	600	589
		Std. Error	-		2	-	-	9
		Range	570- 570		530- 625	495- 495	600- 600	565- 610
		Sample Size	1	0	73	1	1	5
	F	Mean Length			552	525	558	545
		Std. Error			2	-	3	-
		Range			505- 595	525- 525	555- 560	545- 545
		Sample Size	0	0	99	1	2	1
	M	Mean Length	600	510	572	500	588	590
		Std. Error	-	-	2	-	20	-
		Range	600- 600	510- 510	525- 630	500- 500	550- 620	590- 590
		Sample Size	1	1	65	1	3	1
7/10, 12 (7/8-14)	F	Mean Length	535	484	546	512		605
		Std. Error	13	6	2	26		-
		Range	510- 550	470- 500	500- 580	460- 545		605- 605
		Sample Size	3	4	90	3	0	1
	M	Mean Length	560	510	578		590	586
		Std. Error	10	8	2		20	9
		Range	550- 570	500- 525	510- 620		570- 610	555- 620
		Sample Size	2	3	72	0	2	6
	F	Mean Length	555	482	543	493		535
		Std. Error	-	8	2	23		20
		Range	555- 555	465- 515	500- 585	470- 515		515- 555
		Sample Size	1	6	66	2	0	2
7/17, 18 (7/15-22)	M	Mean Length			581			558
		Std. Error			2			8
		Range			545- 615			550- 565
		Sample Size	0	0	49	0	0	2
	F	Mean Length		508	540			565
		Std. Error		8	5			
		Range		500- 515	475- 585			565- 565
		Sample Size	0	2	34	0	0	1
7/28-30 7/23-9/22	M	Mean Length	578	510	578	497	591	584
		Range	550- 600	500- 525	510- 630	495- 500	550- 620	550- 620
		Sample Size	4	4	259	2	6	14
	F	Mean Length	537	487	547	512	558	564
		Range	510- 555	465- 515	475- 595	460- 545	555- 560	515- 605
		Sample Size	4	12	289	6	2	5
	M	Mean Length						
		Range						
		Sample Size						
Season	M	Mean Length	578	510	578	497	591	584
		Range	550- 600	500- 525	510- 630	495- 500	550- 620	550- 620
		Sample Size	4	4	259	2	6	14
	F	Mean Length	537	487	547	512	558	564
		Range	510- 555	465- 515	475- 595	460- 545	555- 560	515- 605
		Sample Size	4	12	289	6	2	5
	M	Mean Length						
		Range						
		Sample Size						

Table 13. Age and sex of chum salmon from the Middle Fork Goodnews River weir based on escapement sampling, 2000

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class							
			0.2		0.3		0.4		Total	
			Esc.	%	Esc.	%	Esc.	%	Esc.	%
(7/6-10)	0	M								
		F								
		Subtotal							4,499	
7/12-14	122	M	0	0.0	834	22.9	1,162	32.0	1,996	54.9
(7/11-16)		F	0	0.0	686	18.9	953	26.2	1,639	45.1
		Subtotal	0	0.0	1,520	41.8	2,115	58.2	3,635	100.0
7/19-20	100	M	23	1.0	459	20.0	803	35.0	1,285	56.0
(7/17-22)		F	0	0.0	780	34.0	230	10.0	1,010	44.0
		Subtotal	23	1.0	1,239	54.0	1,033	45.0	2,295	100.0
7/25, 27-29	196	M	34	1.0	706	20.9	723	21.4	1,463	43.4
(7/23-9/22)		F	69	2.1	1,084	32.2	757	22.5	1,911	56.6
		Subtotal	103	3.1	1,790	53.1	1,480	43.9	3,374	100.0
Season	418	M								
		F								
		Total							13,803	

Table 14. Mean length (mm) of chum salmon at the Middle Fork Goodnews River Weir based on escapement sampling, 2000.

Sample Dates (Stratum Dates)	Sex		Age class		
			0.2	0.3	0.4
7/12-14 (7/11-16)	M	Mean Length		604	624
		Std. Error		5	5
		Range		570- 665	560- 700
		Sample Size	0	28	39
	F	Mean Length		575	599
		Std. Error		3	4
		Range		545- 605	530- 645
		Sample Size	0	23	31
7/19-20 (7/17-22)	M	Mean Length	535	600	625
		Std. Error	-	5	6
		Range	535- 535	545- 645	570- 705
		Sample Size	1	20	35
	F	Mean Length		575	586
		Std. Error		4	7
		Range		535- 620	555- 615
		Sample Size	0	34	10
7/25, 27-29 (7/23-9/22)	M	Mean Length	573	596	619
		Std. Error	3	4	5
		Range	570- 575	530- 650	555- 685
		Sample Size	2	41	42
	F	Mean Length	543	565	578
		Std. Error	3	3	3
		Range	535- 550	520- 650	525- 625
		Sample Size	4	63	44

Table 15. Age and sex of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000

Stratum dates	sampling dates	sample size	sex	Age class							
				1.1		2.1		3.1		Total	
				number in escapement	percentage in sample	number in escapement	percentage in sample	number in escapement	percentage in sample	number in escapement	percentage in sample
7/29-8/18	8/14-8/15	149	M	0	0	2792	62.4	0	0	2,792	62.4
			F	0	0	1682	37.6	0	0	1,682	37.6
			subtotal	0	0	4474	100	0	0	4,474	100.0
8/19-8/25	8/21-8/22	137	M	0	0	1726	46	0	0	1,726	46.0
			F	27	0.7	2000	53.3	0	0	2,027	54.0
			subtotal	27	0.7	3726	99.3	0	0	3,753	100.0
8/26-8/30	8/28	76	M	0	0	4133	50	0	0	4,133	50.0
			F	109	1.3	4024	48.7	0	0	4,133	50.0
			subtotal	109	1.3	8157	98.7	0	0	8,266	100.0
9/3-9/4	8/31-9/22	57	M	0	0	1564	49.1	0	0	1,564	49.1
			F	168	5.3	1340	42.1	112	3.5	1,619	50.9
			subtotal	168	5.3	2904	91.2	112	3.5	3,183	100.0
seasonal		419	M	0	0	10215	51.9	0	0	10,215	51.9
			F	304	1.5	9046	46	112	0.6	9,461	48.1
			total	304	1.5	19261	97.9	112	0.6	19,676	100.0

Table 16. Mean length (mm) of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2000

stratum	sampling				age		
dates	dates	sex			11	21	31
7/29-8/18	8/14-8/15	M	mean			567	
			std. err.			5	
			range			415-660	
			n	0		93	0
		F	mean			582	
			std. err.			4	
			range			490-675	
			n	0		56	0
8/19-8/25	8/21-8/22	M	mean			602	
			std. err.			8	
			range			465-685	
			n	0		63	0
		F	mean	590		601	
			std. err.	0		3	
			range	590-590		545-645	
			n	1		73	0
8/26-8/30	8/28	M	mean			583	
			std. err.			9	
			range			410-665	
			n	0		38	0
		F	mean	545		592	
			std. err.	0		4	
			range	545-545		520-650	
			n	1		37	0
8/31-9/22	9/3-9/4	M	mean			648	
			std. err.			9	
			range			515-720	
			n	0		28	0
		F	mean			634	640
			std. err.			6	0
			range			575-705	640-640
			n			24	2
Season		M	mean			592	
			std. err.			4	
			range			410-720	
			n	0		222	0
		F	mean	584		598	640
			std. err.	8		2	0
			range	545-625		490-705	640-640
			n	5		190	2

Table 17. Age and sex of chinook salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class									
			1.2		1.3		1.4		1.5		Total	
			Catch	%	Catch	%	Catch	%	Catch	%	Catch	%
6/26 (6/26, 29)	204	M	609	19.6	715	23.0	61	2.0	0	0.0	1,385	44.6
		F	30	1.0	1,233	39.7	411	13.2	46	1.5	1,719	55.4
		Total	639	20.6	1,948	62.7	472	15.2	46	1.5	3,104	100.0
7/3 (7/3, 6)	135	M	88	14.8	247	41.5	79	13.3	5	0.8	419	70.4
		F	0	0.0	79	13.3	93	15.6	4	0.7	176	29.6
		Subtotal	88	14.8	326	54.8	172	28.9	9	1.5	595	100.0
7/11 (7/8-24)	37	M	181	24.3	140	18.9	0	0.0	20	2.7	341	45.9
		F	0	0.0	181	24.3	221	29.7	0	0.0	402	54.1
		Subtotal	181	24.3	321	43.2	221	29.7	20	2.7	743	100.0
Season	376	M	878	19.7	1,102	24.8	140	3.2	25	0.6	2,145	48.3
		F	30	0.7	1,493	33.6	724	16.3	50	1.1	2,297	51.7
		Total	908	20.4	2,595	58.4	864	19.5	75	1.7	4,442	100.0

Table 18. Mean length (mm) of chinook salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sex		Age class			
			1.2	1.3	1.4	1.5
6/26 (6/26)	M	Mean Length	522	646	728	
		Std. Error	7	7	67	
		Range	454-633	562-820	642-928	
		Sample Size	40	47	4	0
	F	Mean Length	668	737	839	883
		Std. Error	113	6	10	26
		Range	555-781	616-902	707-927	834-923
		Sample Size	2	81	27	3
7/3 (7/3, 6)	M	Mean Length	516	714	854	925
		Std. Error	12	8	23	-
		Range	385-620	575-850	645-1020	925-925
		Sample Size	20	56	18	1
	F	Mean Length		774	855	910
		Std. Error		11	10	-
		Range		725-870	790-980	910-910
		Sample Size	0	18	21	1
	M	Mean Length	548	707		967
		Std. Error	12	13		-
		Range	505-624	654-749		967-967
		Sample Size	9	7	0	1
	F	Mean Length		779	876	
		Std. Error		17	17	
		Range		694-873	776-955	
		Sample Size	0	9	11	0
Season	M	Mean Length	526	669	799	959
		Range	385-633	562-850	642-1020	925-967
		Sample Size	69	110	22	2
	F	Mean Length	688	744	853	885
		Range	555-781	616-902	707-980	834-923
		Sample Size	2	108	59	4

Table 19. Age and sex of sockeye salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class											
			0.3		1.2		1.3		2.2		2.3		Total	
			Catch	%	Catch	%	Catch	%	Catch	%	Catch	%	Catch	%
6/29 (6/26, 29)	174	M	64	1.1	0	0.0	3,118	56.3	0	0.0	191	3.4	3,373	60.9
		F	0	0.0	32	0.6	2,132	38.5	0	0.0	0	0.0	2,163	39.1
		Subtotal	64	1.1	32	0.6	5,250	94.8	0	0.0	191	3.4	5,536	100.0
7/6 (7/3, 6, 8)	183	M	70	0.5	769	6.0	6,573	51.4	70	0.5	350	2.7	7,832	61.2
		F	0	0.0	140	1.1	4,755	37.1	0	0.0	70	0.6	4,965	38.8
		Subtotal	70	0.5	909	7.1	11,328	88.5	70	0.5	420	3.3	12,797	100.0
7/11 (7/11, 13, 15)	185	M	0	0.0	311	5.9	2,294	43.8	0	0.0	0	0.0	2,606	49.7
		F	28	0.5	340	6.5	2,238	42.7	0	0.0	28	0.5	2,634	50.3
		Subtotal	28	0.5	651	12.4	4,532	86.5	0	0.0	28	0.5	5,240	100.0
7/21 (7/17-8/24)	173	M	158	1.1	553	4.1	6,325	46.3	791	5.8	633	4.6	8,460	61.8
		F	79	0.6	633	4.6	3,163	23.1	1,028	7.5	316	2.3	5,219	38.2
		Subtotal	237	1.7	1186	8.7	9,488	69.4	1,819	13.3	949	6.9	13,679	100.0
Season	715	M	292	0.8	1634	4.4	18,311	49.1	861	2.3	1,173	3.2	22,271	59.8
		F	107	0.3	1144	3.1	12,287	33.0	1,028	2.8	415	1.1	14,981	40.2
		Total	399	1.1	2778	7.5	30,598	82.1	1,889	5.1	1,588	4.3	37,252	100.0

Table 20. Mean length (mm) of sockeye salmon from District W-5 based on commercial harvest sampling, 2000

Sample Dates (Stratum Dates)	Sex		Age class				
			0.3	1.2	1.3	2.2	2.3
6/29 (6/26, 29)	M	Mean Length	591		591		597
		Std. Error	17		2		10
		Range	574- 608		527- 636		574- 638
		Sample Size	2	0	98	0	6
	F	Mean Length		540	562		
		Std. Error		-	3		
		Range		540- 540	516- 612		
		Sample Size	0	1	67	0	0
7/6 (7/3, 6, 8)	M	Mean Length	580	525	585	575	594
		Std. Error	-	8	2	-	8
		Range	580- 580	475- 565	510- 635	575- 575	575- 615
		Sample Size	1	11	94	1	5
	F	Mean Length		523	564		570
		Std. Error		8	2		-
		Range		515- 530	515- 600		570- 570
		Sample Size	0	2	68	0	1
7/11 (7/11, 13, 15)	M	Mean Length		541	585		
		Std. Error		6	2		
		Range		503- 570	526- 643		
		Sample Size	0	11	81	0	0
	F	Mean Length	563	499	559		546
		Std. Error	-	4	3		-
		Range	563- 563	475- 523	503- 608		546- 546
		Sample Size	1	12	79	0	1
7/21 (7/17-8/24)	M	Mean Length	593	544	598	565	601
		Std. Error	5	10	3	10	7
		Range	588- 597	500- 580	529- 635	547- 652	581- 640
		Sample Size	2	7	80	10	8
	F	Mean Length	584	524	570	530	581
		Std. Error	-	11	3	6	9
		Range	584- 584	481- 563	519- 605	500- 567	559- 597
		Sample Size	1	8	40	13	4
Season	M	Mean Length	589	534	590	566	598
		Range	574- 608	475- 580	510- 643	547- 652	574- 640
		Sample Size	5	29	353	11	19
	F	Mean Length	578	517	564	530	576
		Range	563- 584	475- 563	503- 612	500- 567	546- 597
		Sample Size	2	23	254	13	6

Table 21. Age and sex of chum salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class							
			0.2		0.3		0.4		Total	
			Esc.	%	Esc.	%	Esc.	%	Esc.	%
(7/6-10)	0	M								
		F								
		Subtotal							4,499	
7/12-14	122	M	0	0.0	834	22.9	1,162	32.0	1,996	54.9
(7/11-16)		F	0	0.0	686	18.9	953	26.2	1,639	45.1
		Subtotal	0	0.0	1,520	41.8	2,115	58.2	3,635	100.0
7/19-20	100	M	23	1.0	459	20.0	803	35.0	1,285	56.0
(7/17-22)		F	0	0.0	780	34.0	230	10.0	1,010	44.0
		Subtotal	23	1.0	1,239	54.0	1,033	45.0	2,295	100.0
7/25, 27-29	196	M	34	1.0	706	20.9	723	21.4	1,463	43.4
(7/23-9/22)		F	69	2.1	1,084	32.2	757	22.5	1,911	56.6
		Subtotal	103	3.1	1,790	53.1	1,480	43.9	3,374	100.0
Season	418	M								
		F								
		Total							13,803	

Table 22. Mean length (mm) of chum salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sex		Age class			
			0.2	0.3	0.4	0.5
6/29 (6/26, 29)	M	Mean Length		611	632	
		Std. Error		5	5	
		Range		574- 663	532- 723	
		Sample Size	0	22	53	0
	F	Mean Length		589	603	616
		Std. Error		5	3	-
		Range		528- 683	540- 697	616- 616
		Sample Size	0	40	85	1
7/6 (7/3, 6, 8)	M	Mean Length		608	624	
		Std. Error		3	4	
		Range		570- 660	570- 700	
		Sample Size	0	50	45	0
	F	Mean Length		578	595	
		Std. Error		4	3	
		Range		505- 620	520- 680	
		Sample Size	0	40	73	0
7/11 (7/11- 8/24)	M	Mean Length		610	628	621
		Std. Error		4	6	-
		Range		557- 657	563- 677	621- 621
		Sample Size	0	31	28	1
	F	Mean Length		573	593	559
		Std. Error		2	4	-
		Range		527- 625	552- 663	559- 559
		Sample Size	0	79	49	1
Season	M	Mean Length		609	628	621
		Range		557- 663	532- 723	621- 621
		Sample Size	0	103	126	1
	F	Mean Length		579	598	592
		Range		505- 683	520- 697	559- 616
		Sample Size	0	159	207	2

Table 23. Age and sex of coho salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class							
			1.1		2.1		3.1		Total	
			Catch	%	Catch	%	Catch	%	Catch	%
8/10 (7/21 - 8/12)	155	M	84	1.3	3,074	47.1	42	0.7	3,200	49.0
		F	0	0.0	3,284	50.3	42	0.6	3,326	51.0
		Subtotal	84	1.3	6,358	97.4	84	1.3	6,526	100.0
8/16 (8/14 - 18)	143	M	0	0.0	2,836	46.9	0	0.0	2,836	46.9
		F	0	0.0	3,132	51.7	85	1.4	3,217	53.1
		Subtotal	0	0.0	5,968	98.6	85	1.4	6,053	100.0
8/24 (8/21 - 24)	141	M	0	0.0	1,361	46.1	42	1.4	1,403	47.5
		F	21	0.7	1,465	49.6	63	2.1	1,549	52.5
		Subtotal	21	0.7	2,826	95.7	105	3.5	2,952	100.0
Season	439	M	84	0.6	7,270	46.8	84	0.6	7,439	47.9
		F	21	0.1	7,882	50.8	190	1.2	8,092	52.1
		Total	105	0.7	15,152	97.6	274	1.8	15,531	100.0

Table 24. Mean length (mm) of coho salmon from District W-5 based on commercial harvest sampling, 2000.

Sample Dates (Stratum Dates)	Sex		Age class		
			1.1	2.1	3.1
8/10 (7/21 - 8/12)	M	Mean Length	518	586	635
		Std. Error	18	5	-
		Range	500- 535	480- 650	635- 635
		Sample Size	2	73	1
	F	Mean Length		587	605
		Std. Error		3	-
		Range		455- 625	605- 605
		Sample Size	0	78	1
8/16 (8/14 - 18)	M	Mean Length		610	
		Std. Error		5	
		Range		485- 670	
		Sample Size	0	67	0
	F	Mean Length		603	562
		Std. Error		3	22
		Range		530- 670	540- 583
		Sample Size	0	74	2
8/24 (8/21 - 24)	M	Mean Length		625	600
		Std. Error		5	45
		Range		470- 735	555- 645
		Sample Size	0	65	2
	F	Mean Length	600	603	598
		Std. Error	-	3	12
		Range	600- 600	525- 650	580- 620
		Sample Size	1	70	3
Season	M	Mean Length	518	602	618
		Range	500- 535	470- 735	555- 645
		Sample Size	2	205	3
	F	Mean Length	600	596	583
		Range	600- 600	455- 670	540- 620
		Sample Size	1	222	6

Table 25. Age and sex of chinook salmon at the Middle Fork Goodnews River based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class											
			1.1		1.2		1.3		1.4		1.5		Total	
			Catch	%	Catch	%	Catch	%	Catch	%	Catch	%	Catch	%
6/29 (6/29)	112	M	0	0.0	73	7.1	119	11.6	237	23.2	9	0.9	438	42.9
		F	0	0.0	37	3.6	155	15.2	374	36.6	18	1.8	584	57.1
		Total	0	0.0	110	10.7	274	26.8	611	59.8	27	2.7	1,022	100.0
7/6, 10 (7/6,10)	60	M	0	0.0	46	16.7	19	6.7	23	8.4	0	0.0	88	31.7
		F	0	0.0	0	0.0	14	5.0	177	63.3	0	0.0	191	68.3
		Subtotal	0	0.0	46	16.7	33	11.7	200	71.7	0	0.0	279	100.0
7/13, 20 (7/13-8/24)	90	M	2	1.1	34	15.6	22	10.0	22	10.0	0	0.0	80	36.7
		F	0	0.0	0	0.0	12	5.6	126	57.8	0	0.0	138	63.3
		Subtotal	2	1.1	34	15.6	34	15.6	148	67.8	0	0.0	218	100.0
Season	262	M	2	0.2	153	10.1	159	10.5	282	18.6	9	0.6	606	39.9
		F	0	0.0	37	2.4	181	11.9	677	44.5	18	1.2	913	60.1
		Total	2	0.2	190	12.5	340	22.4	959	63.1	27	1.8	1,519	100.0

Table 26. Mean length (mm) of chinook salmon at the Middle Fork Goodnews River based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sex						
			1.2	1.3	1.4	2.4	
6/30	M	Mean Length	550	703	768	945	
		Std. Error	-	128	57	-	
		Range	550-550	575-830	695-935	945-945	
		Sample Size	1	2	4	1	
	F	Mean Length		850	886		
		Std. Error		95	35		
		Range		755-945	825-980		
		Sample Size	0	2	4	0	
	7/14	M	Mean Length	565		865	
			Std. Error	-		36	
Range			565-565		760-915		
Sample Size			1	0	4	0	
F		Mean Length			820		
		Std. Error			100		
		Range			720-920		
		Sample Size	0	0	2	0	
7/18	M	Mean Length	517	775	835		
		Std. Error	45	-	31		
		Range	430-580	775-775	760-910		
		Sample Size	3	1	4	0	
	F	Mean Length			843		
		Std. Error			19		
		Range			760-915		
		Sample Size	0	0	10	0	
Season	M	Mean Length	533	727	823	945	
		Range	430-580	575-830	695-935	945-945	
		Sample Size	5	3	12	1	
	F	Mean Length		850	851		
		Range		755-945	720-980		
		Sample Size	0	2	16	0	

Table 27. Age and sex of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class													
			0.3		1.2		1.3		2.2		1.4		2.3		Total	
			Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
6/30, 7/1, 3 (6/26-7/7)	170	M	0	0.0	0	0.0	3,920	39.4	59	0.6	293	2.9	644	6.5	4,914	49.4
		F	117	1.2	0	0.0	3,803	38.2	58	0.6	585	5.9	468	4.7	5,032	50.6
		Subtotal	117	1.2	0	0.0	7,723	77.6	117	1.2	878	8.8	1,112	11.2	9,946	100.0
7/11, 12, 14 (7/8-17)	172	M	0	0.0	89	1.2	3,488	45.9	0	0.0	574	7.6	221	2.9	4,372	57.6
		F	44	0.6	88	1.1	2,650	34.9	0	0.0	221	2.9	221	2.9	3,223	42.4
		Subtotal	44	0.6	177	2.3	6,138	80.8	0	0.0	795	10.5	442	5.8	7,595	100.0
7/21, 23, 24 (7/18-8/14)	90	M	36	1.1	108	3.3	1,039	32.2	0	0.0	144	4.4	0	0.0	1,326	41.1
		F	0	0.0	143	4.5	1,541	47.8	0	0.0	179	5.6	36	1.1	1,899	58.9
		Subtotal	36	1.1	251	7.8	2,580	80.0	0	0.0	323	10.0	36	1.1	3,225	100.0
Season	432	M	36	0.1	196	1.0	8,448	40.7	59	0.3	1,010	4.9	864	4.2	10,612	51.1
		F	161	0.8	231	1.1	7,993	38.5	58	0.3	985	4.7	725	3.5	10,154	48.9
		Total	197	0.9	427	2.1	16,441	79.2	117	0.6	1,995	9.6	1,589	7.7	20,766	100.0

Table 28. Mean length (mm) of sockeye salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sex	Age class							
		0.3	1.2	1.3	2.2	1.4	2.3		
6/30, 7/1, 3 (6/26-7/7)	M	Mean Length			592	575	622	590	
		Std. Error			4	-	12	5	
		Range			500- 660	575- 575	600- 665	550- 610	
		Sample Size	0	0	67	1	5	11	
	F	Mean Length	555		551	500	582	538	
		Std. Error	15		4	-	10	12	
		Range	540- 570		455- 640	500- 500	510- 610	510- 605	
		Sample Size	2	0	65	1	10	8	
	7/11, 12, 14 (7/8-17)	M	Mean Length		590	597		606	589
			Std. Error		15	3		8	16
Range				575- 605	540- 645		520- 635	555- 640	
Sample Size			0	2	79	0	13	5	
F		Mean Length	555	548	555		570	541	
		Std. Error	-	8	3		12	8	
		Range	555- 555	540- 555	440- 605		535- 600	515- 565	
		Sample Size	1	2	60	0	5	5	
7/21, 23, 24 (7/18-8/14)		M	Mean Length	560	518	587		599	
			Std. Error	-	51	4		8	
	Range		560- 560	420- 590	548- 625		585- 620		
	Sample Size		1	3	29	0	4	0	
	F	Mean Length		471	547		569	530	
		Std. Error		6	3		6	-	
		Range		455- 480	500- 605		560- 585	530- 530	
		Sample Size	0	4	43	0	5	1	
	Season	M	Mean Length	560	551	593	575	610	589
			Range	560- 560	420- 605	500- 660	575- 575	520- 665	550- 640
Sample Size			1	5	175	1	22	16	
F		Mean Length	555	500	551	500	577	538	
		Range	540- 570	455- 555	440- 640	500- 500	510- 610	510- 605	
		Sample Size	3	6	168	1	20	14	

Table 29. Age and sex of chum salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class									
			0.2		0.3		0.4		0.5		Total	
			Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
7/5, 7 - 9 (6/26 - 7/13)	203	M	0	0.0	955	19.7	1,744	36.0	24	0.5	2,723	56.2
		F	0	0.0	932	19.2	1,194	24.6	0	0.0	2,126	43.8
		Subtotal	0	0.0	1,887	38.9	2,938	60.6	24	0.5	4,849	100.0
7/18 - 20 (7/14 - 22)	192	M	54	0.5	3,296	31.8	1,080	10.4	0	0.0	4,430	42.7
		F	0	0.0	3,998	38.5	1,945	18.8	0	0.0	5,943	57.3
		Subtotal	54	0.5	7,294	70.3	3,025	29.2	0	0.0	10,373	100.0
7/25 - 27 (7/23 - 30)	196	M	32	0.5	2,622	41.3	486	7.7	0	0.0	3,140	49.5
		F	65	1.0	2,427	38.3	712	11.2	0	0.0	3,204	50.5
		Subtotal	97	1.5	5,049	79.6	1,198	18.9	0	0.0	6,344	100.0
8/2 - 5 (7/31 - 9/30)	177	M	0	0.0	1,427	27.1	208	4.0	0	0.0	1,635	31.1
		F	30	0.6	3,271	62.2	327	6.2	0	0.0	3,628	68.9
		Subtotal	30	0.6	4,698	89.3	535	10.2	0	0.0	5,263	100.0
Season	768	M	86	0.3	8,300	31.0	3,518	13.1	24	0.1	11,928	44.5
		F	95	0.4	10,628	39.6	4,178	15.6	0	0.0	14,901	55.5
		Total	181	0.7	18,928	70.6	7,696	28.7	24	0.1	26,829	100.0

Table 30. Mean length (mm) of chum salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sex		Age class			
			0.2	0.3	0.4	0.5
7/5, 7 - 9 (6/26 - 7/13)	M	Mean Length		604	635	645
		Std. Error		5	4	
		Range		530- 650	510- 700	645- 645
		Sample Size	0	40	73	1
	F	Mean Length		579	598	
		Std. Error		4	3	
		Range		515- 625	550- 660	
		Sample Size	0	39	50	0
7/18 - 20 (7/14 - 22)	M	Mean Length	575	597	619	
		Std. Error	-	4	8	
		Range	575- 575	525- 670	550- 700	
		Sample Size	1	61	20	0
	F	Mean Length		569	583	
		Std. Error		3	5	
		Range		505- 630	515- 700	
		Sample Size	0	74	36	0
7/25 - 27 (7/23 - 30)	M	Mean Length	585	594	624	
		Std. Error	-	3	6	
		Range	585- 585	525- 660	585- 680	
		Sample Size	1	81	15	0
	F	Mean Length	553	569	575	
		Std. Error	8	3	6	
		Range	545- 560	520- 615	540- 620	
		Sample Size	2	75	22	0
8/2 - 5 (7/31 - 9/30)	M	Mean Length		585	607	
		Std. Error		4	12	
		Range		535- 650	565- 660	
		Sample Size	0	48	7	0
	F	Mean Length	550	557	563	
		Std. Error	-	2	8	
		Range	550- 550	500- 620	525- 610	
		Sample Size	1	110	11	0
Season	M	Mean Length	579	595	627	645
		Range	575- 585	525- 670	510- 700	645- 645
		Sample Size	2	230	115	1
	F	Mean Length	552	566	584	
		Range	545- 560	500- 630	515- 700	
		Sample Size	3	298	119	0

Table 31. Age and sex of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class									
			1.1		2.1		2.2		3.1		Total	
			Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
8/22-23, 25-27 (7/29 - 8/29)	144	M	304	4.2	3,704	50.7	0	0.0	51	0.7	4,059	55.6
		F	0	0.0	3,095	42.4	0	0.0	152	2.1	3,247	44.4
		Subtotal	304	4.2	6,799	93.1	0	0.0	203	2.8	7,306	100.0
8/31 - 9/2 (8/30 - 9/6)	145	M	533	6.2	3,377	39.3	0	0.0	59	0.7	3,969	46.2
		F	178	2.1	4,087	47.6	0	0.0	356	4.1	4,621	53.8
		Subtotal	711	8.3	7,464	86.9	0	0.0	415	4.8	8,590	100.0
9/11 - 14 (9/7 - 29)	150	M	224	6.0	1,343	36.0	0	0.0	99	2.7	1,666	44.7
		F	149	4.0	1,865	50.0	0	0.0	50	1.3	2,064	55.3
		Subtotal	373	10.0	3,208	86.0	0	0.0	149	4.0	3,730	100.0
Season	439	M	1,061	5.4	8,423	42.9	0	0.0	210	1.1	9,694	49.4
		F	327	1.7	9,048	46.1	0	0.0	557	2.8	9,932	50.6
		Total	1,388	7.1	17,471	89.0	0	0.0	767	3.9	19,626	100.0

Table 32. Mean length (mm) of coho salmon at the Middle Fork Goodnews River weir based on escapement sampling, 2001.

Sample Dates (Stratum Dates)	Sex		Age class		
			1.1	2.1	3.1
8/22-23, 25-27 (7/29 - 8/29)	M	Mean Length	575	599	510
		Std. Error	31	5	-
		Range	465- 660	505- 675	510- 510
		Sample Size	6	73	1
	F	Mean Length		607	600
		Std. Error		4	16
		Range		490- 660	575- 630
		Sample Size	0	61	3
8/31 - 9/2 (8/30 - 9/6)	M	Mean Length	602	620	685
		Std. Error	9	5	-
		Range	540- 640	495- 690	685- 685
		Sample Size	9	57	1
	F	Mean Length	617	614	638
		Std. Error	26	3	9
		Range	565- 645	555- 675	605- 665
		Sample Size	3	69	6
9/11 - 14 (9/7 - 29)	M	Mean Length	605	631	625
		Std. Error	13	5	22
		Range	540- 660	500- 710	570- 665
		Sample Size	9	54	4
	F	Mean Length	623	622	628
		Std. Error	8	3	18
		Range	590- 640	565- 670	610- 645
		Sample Size	6	75	2
Season	M	Mean Length	595	613	614
		Range	465- 660	495- 710	510- 685
		Sample Size	24	184	6
	F	Mean Length	620	613	627
		Range	565- 645	490- 675	575- 665
		Sample Size	9	205	11

Table 33. Age and sex of chinook salmon from District W-5 based on commercial harvest sampling, 2001

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class											
			1.1		1.2		1.3		1.4		1.5		Total	
			Catch	%	Catch	%	Catch	%	Catch	%	Catch	%	Catch	%
6/29 (6/29)	112	M	0	0.0	73	7.1	119	11.6	237	23.2	9	0.9	438	42.9
		F	0	0.0	37	3.6	155	15.2	374	36.6	18	1.8	584	57.1
		Total	0	0.0	110	10.7	274	26.8	611	59.8	27	2.7	1,022	100.0
7/6, 10 (7/6,10)	60	M	0	0.0	46	16.7	19	6.7	23	8.4	0	0.0	88	31.7
		F	0	0.0	0	0.0	14	5.0	177	63.3	0	0.0	191	68.3
		Subtotal	0	0.0	46	16.7	33	11.7	200	71.7	0	0.0	279	100.0
7/13, 20 (7/13-8/24)	90	M	2	1.1	34	15.6	22	10.0	22	10.0	0	0.0	80	36.7
		F	0	0.0	0	0.0	12	5.6	126	57.8	0	0.0	138	63.3
		Subtotal	2	1.1	34	15.6	34	15.6	148	67.8	0	0.0	218	100.0
Season	262	M	2	0.2	153	10.1	159	10.5	282	18.6	9	0.6	606	39.9
		F	0	0.0	37	2.4	181	11.9	677	44.5	18	1.2	913	60.1
		Total	2	0.2	190	12.5	340	22.4	959	63.1	27	1.8	1,519	100.0

Table 34. Mean length (mm) of chinook salmon from District W-5 based on commercial harvest sampling, 2001.

Sample Dates (Stratum Dates)	Sex		Age class				
			1.1	1.2	1.3	1.4	1.5
6/29 (6/29)	M	Mean Length		489	705	810	785
		Std. Error		10	24	24	-
		Range		435- 520	470- 825	480-1010	785- 785
		Sample Size	0	8	13	26	1
	F	Mean Length		664	722	840	940
		Std. Error		64	13	11	20
		Range		580- 850	665- 825	635- 970	920- 960
		Sample Size	0	4	17	41	2
7/6, 10 (7/6,10)	M	Mean Length		520	702	897	
		Std. Error		13	28	19	
		Range		460- 595	650- 757	830- 934	
		Sample Size	0	10	4	5	0
	F	Mean Length			826	861	
		Std. Error			18	10	
		Range			790- 847	753-1031	
		Sample Size	0	0	3	38	0
7/13, 20 (7/13-8/24)	M	Mean Length	383	512	664	862	
		Std. Error	-	15	18	26	
		Range	383- 383	429- 604	595- 766	752- 962	
		Sample Size	1	14	9	9	0
	F	Mean Length			782	878	
		Std. Error			27	6	
		Range			715- 850	772- 975	
		Sample Size	0	0	5	52	0
Season	M	Mean Length	383	504	699	821	785
		Range	383- 383	429- 604	470- 825	480-1010	785- 785
		Sample Size	1	32	26	40	1
	F	Mean Length		664	734	853	940
		Range		580- 850	665- 850	635-1031	920- 960
		Sample Size	0	4	25	131	2

Table 35. Age and sex of sockeye salmon from District W-5 based on commercial harvest sampling, 2001

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class											
			0.3		1.2		1.3		1.4		2.3		Total	
			Catch	%	Catch	%	Catch	%	Catch	%	Catch	%	Catch	%
7/6 (6/29, 7/6)	162 tab 35	M	68	0.6	69	0.6	4,923	44.4	137	1.3	273	2.5	5,470	49.4
		F	0	0.0	68	0.6	5,401	48.8	136	1.2	0	0.0	5,606	50.6
		Subtotal	68	0.6	137	1.2	10,324	93.2	273	2.5	273	2.5	11,076	100.0
7/10 (7/10)	137	M	0	0.0	29	0.7	1,769	43.8	29	0.7	118	2.9	1,946	48.2
		F	0	0.0	59	1.5	1,916	47.4	59	1.5	59	1.5	2,093	51.8
		Subtotal	0	0.0	88	2.2	3,685	91.2	88	2.2	177	4.4	4,039	100.0
7/13 (7/13)	177	M	0	0.0	57	1.2	1,870	37.3	28	0.6	227	4.5	2,181	43.5
		F	28	0.6	56	1.1	2,634	52.5	0	0.0	113	2.3	2,833	56.5
		Subtotal	28	0.6	113	2.3	4,504	89.8	28	0.6	340	6.8	5,014	100.0
7/20 (7/20,23,8/1,6,8,10,15, 18,22,24)	100	M	0	0.0	221	4.0	2,376	43.0	166	3.0	221	4.0	2,984	54.0
		F	0	0.0	0	0.0	2,265	41.0	0	0.0	276	5.0	2,541	46.0
		Subtotal	0	0.0	221	4.0	4,641	84.0	166	3.0	497	9.0	5,525	100.0
Season	576	M	69	0.3	375	1.5	10,937	42.7	360	1.4	839	3.3	12,580	49.0
		F	28	0.1	184	0.7	12,217	47.6	196	0.8	449	1.7	13,074	51.0
		Total	97	0.4	559	2.2	23,154	90.3	556	2.2	1,288	5.0	25,654	100.0

Table 36. Mean length (mm) of sockeye salmon from District W-5 based on commercial harvest sampling, 2001.

Sample Dates (Stratum Dates)	Sex		Age class				
			0.3	1.2	1.3	1.4	2.3
7/6 (6/29, 7/6)	M	Mean Length	580	535	602	620	596
		Std. Error	-	-	3	15	7
		Range	580- 580	535- 535	535- 650	605- 635	585- 615
		Sample Size	1	1	72	2	4
	F	Mean Length		485	564	578	
		Std. Error		-	2	18	
		Range		485- 485	520- 605	560- 595	
		Sample Size	0	1	79	2	0
7/10 (7/10)	M	Mean Length		615	602	615	614
		Std. Error		-	2	-	8
		Range		615- 615	561- 640	615- 615	598- 630
		Sample Size	0	1	60	1	4
	F	Mean Length		552	564	546	535
		Std. Error		8	3	20	29
		Range		544- 559	509- 600	526- 565	506- 563
		Sample Size	0	2	65	2	2
7/13 (7/13)	M	Mean Length		546	598	570	595
		Std. Error		23	3	.	4
		Range		523- 569	523- 646	570- 570	582- 614
		Sample Size	0	2	66	1	8
	F	Mean Length	531	527	565		587
		Std. Error	-	17	2		5
		Range	531- 531	510- 543	490- 622		578- 596
		Sample Size	1	2	93	0	4
7/20 (7/20,23,8/1,6,8,10,15, 18,22,24)	M	Mean Length		529	600	579	590
		Std. Error		23	3	4	14
		Range		487- 593	566- 641	573- 587	561- 622
		Sample Size	0	4	43	3	4
	F	Mean Length			569		570
		Std. Error			3		10
		Range			534- 599		539- 594
		Sample Size	0	0	41	0	5
Season	M	Mean Length	580	540	601	597	597
		Range	580- 580	487- 615	523- 650	570- 635	561- 630
		Sample Size	1	8	241	7	20
	F	Mean Length	531	519	565	568	570
		Range	531- 531	485- 559	490- 622	526- 595	506- 596
		Sample Size	1	5	278	4	11

Table 37. Age and sex of chum salmon from District W-5 based on commercial harvest sampling, 2001.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class							
			0.2		0.3		0.4		Total	
			Catch	%	Catch	%	Catch	%	Catch	%
7/6 (6/29, 7/6)	110	M	0	0.0	277	17.3	438	27.3	715	44.5
		F	0	0.0	423	26.3	467	29.1	890	55.5
		Subtotal	0	0.0	700	43.6	905	56.4	1,605	100.0
7/10 (7/10)	153	M	0	0.0	41	13.7	20	6.5	61	20.3
		F	0	0.0	167	55.6	72	24.2	239	79.7
		Subtotal	0	0.0	208	69.3	92	30.7	300	100.0
7/13 (7/13)	196	M	4	0.5	175	25.0	79	11.2	258	36.7
		F	0	0.0	312	44.4	132	18.9	444	63.3
		Subtotal	4	0.5	487	69.4	211	30.1	702	100.0
7/20 (7/20, 23, 8/1, 6, 8, 10, 15, 18, 22, 24)	188	M	2	0.5	83	24.5	20	5.9	104	30.9
		F	0	0.0	197	58.5	36	10.6	233	69.1
		Subtotal	2	0.5	280	83.0	56	16.5	337	100.0
Season	647	M	5	0.2	576	19.6	556	18.9	1,138	38.6
		F	0	0.0	1,099	37.3	708	24.0	1,806	61.4
		Total	5	0.2	1,675	56.9	1,264	42.9	2,944	100.0

Table 38. Mean length (mm) chum salmon from District W-5 based on commercial harvest sampling, 2001.

Sample Dates (Stratum Dates)	Sex		Age class		
			0.2	0.3	0.4
7/6 (6/29, 7/6)	M	Mean Length		597	625
		Std. Error		7	5
		Range		550- 645	555- 670
		Sample Size	0	19	30
	F	Mean Length		576	588
		Std. Error		5	4
		Range		535- 625	540- 650
		Sample Size	0	29	32
7/10 (7/10)	M	Mean Length		602	617
		Std. Error		4	6
		Range		567- 633	587- 652
		Sample Size	0	21	10
	F	Mean Length		565	585
		Std. Error		2	3
		Range		513- 619	548- 643
		Sample Size	0	85	37
7/13 (7/13)	M	Mean Length	565	593	612
		Std. Error	-	4	5
		Range	565- 565	517- 696	574- 654
		Sample Size	1	49	22
	F	Mean Length		567	577
		Std. Error		2	4
		Range		521- 617	530- 641
		Sample Size	0	87	37
7/20 (7/20, 23, 8/1, 6, 8, 10, 15, 18, 22, 24)	M	Mean Length	509	580	597
		Std. Error	-	4	11
		Range	509- 509	514- 650	534- 671
		Sample Size	1	46	11
	F	Mean Length		554	573
		Std. Error		2	6
		Range		509- 606	514- 619
		Sample Size	0	110	20
Season	M	Mean Length	546	593	622
		Range	509- 565	514- 696	534- 671
		Sample Size	2	135	73
	F	Mean Length		568	585
		Range		509- 625	514- 650
		Sample Size	0	311	126

Table 39. Age and sex of coho salmon from District W-5 based on commercial harvest sampling, 2001.

Sample Dates (Stratum Dates)	Sample Size	Sex	Age class							
			1.1		2.1		3.1		Total	
			Catch	%	Catch	%	Catch	%	Catch	%
8/10 (7/23, 8/1, 3, 6, 10, 13)	124	M	34	1.6	1,216	58.0	67	3.2	1,317	62.9
		F	34	1.6	709	33.9	34	1.6	777	37.1
		Subtotal	68	3.2	1,925	91.9	101	4.8	2,094	100.0
8/18 (8/15, 18, 20)	145	M	71	1.4	2,288	44.8	176	3.5	2,535	49.7
		F	211	4.1	2,183	42.8	176	3.4	2,570	50.3
		Subtotal	282	5.5	4,471	87.6	352	6.9	5,105	100.0
8/24 (8/22, 24)	145	M	14	0.7	988	47.6	29	1.4	1,031	49.7
		F	86	4.1	931	44.8	28	1.4	1,045	50.3
		Subtotal	100	4.8	1,919	92.4	57	2.8	2,076	100.0
Season	414	M	118	1.3	4,492	48.4	272	2.9	4,883	52.6
		F	331	3.5	3,823	41.2	239	2.6	4,392	47.4
		Total	449	4.8	8,315	89.6	511	5.5	9,275	100.0

Table 40. Mean length (mm) of coho salmon from District W-5 based on commercial harvest sampling, 2001.

Sample Dates (Stratum Dates)	Sex		Age class		
			1.1	2.1	3.1
8/10 (7/23, 8/1, 6, 8, 10)	M	Mean Length	568	611	593
		Std. Error	43	4	26
		Range	525- 610	501- 669	526- 651
		Sample Size	2	72	4
	F	Mean Length	597	595	613
		Std. Error	12	5	6
		Range	585- 608	505- 643	607- 619
		Sample Size	2	42	2
8/18 (8/15, 18)	M	Mean Length	616	632	629
		Std. Error	14	4	23
		Range	601- 630	500- 695	555- 671
		Sample Size	2	65	5
	F	Mean Length	624	617	628
		Std. Error	21	5	8
		Range	558- 691	520- 679	604- 650
		Sample Size	6	62	5
8/24 (8/22, 24)	M	Mean Length	601	617	624
		Std. Error	.	4	15
		Range	601- 601	498- 674	609- 639
		Sample Size	1	69	2
	F	Mean Length	618	622	599
		Std. Error	7	3	2
		Range	600- 650	507- 668	597- 601
		Sample Size	6	65	2
Season	M	Mean Length	600	623	620
		Range	525- 630	498- 695	526- 671
		Sample Size	5	206	11
	F	Mean Length	620	614	622
		Range	558- 691	505- 679	597- 650
		Sample Size	14	169	9

Table 41. Daily atmospheric and hydrological data from the Middle Fork Goodnews River weir site, 2000.

Date	Cloud Cover-am	Cloud cover-pm	Wind-am (Dir/speed)	Wind-pm (Dir/speed)	Air Temp-am	Air Temp-pm	Water Temp-am	Water Temp-pm	Water Level-am	Water leve- pm	precip-am	precip-pm
6/10	Fog		Calm									
6/11	brkn		E/5-1									
6/12	hi o/c	o/c	NE/gusting	E/10						up 1	dry rain	rain
6/13	3000' o/c	2-3000' brkn	Calm	E/10					41	40	no rain	showers
6/14	2500' solid	2500' solid	E/0-5						40	40	showers	showers
6/15	1000'		Calm								lite rain	
6/16	1500-2000'	1500' brkn	SW/5-10	NW/5			56		44	37	37	no rain
6/17	2000'		SSW/5-10							37		
6/18		1000' o/c		SSW/10-20							36	
6/19	1500'	3000'	Calm	variable						35	33.5	no rain
6/20	1 m vis	2500'	var wind	NW/10						32	32	
6/21	1500' solid	3000' brkn	W/10-15	W/15						31	30	
6/22	CAVU		Calm		34			46		30		
6/23	hi stratis		Calm		40			46		29.5		
6/24	CAVU		Calm							27		
6/25					66					26.5		
6/26	hi stratus		Calm		46			47		26		
6/27	3500' o/c									25		
6/28	1000'	800' ceiling						50		25.25		showers
6/29	1000' o/c		NE/10		48			48		25.5	no rain	
6/30	1/2 m vis	1/2 m vis		Calm			49	46	47	25.5	25	rain
7/1	500' o/c		SE/10							23.5		lite mist
7/2												
7/3	5000'	2000' o/c	Calm	Calm						23	no rain	
7/4	1000' solid		Calm							23.5	23.5	rain
7/5	Fog	Sunny		SW/5-10						22		
7/6	1000'		Calm		9			11		23	mist	
7/7	1400' o/c	2500' o/c	Calm	Calm					10	21	21	no rain
7/8	3000' o/c	3500' solid		N/5-10	13			10		19	18.5	showers
7/9												
7/10	Clear	3000' brkn	N/5	NW/0-5	10			10.5	11.5			
7/11												

continued

Table 40 continued (page 2 of 4)

Date	Cloud Cover-am	Cloud cover-pm	Wind-am (Dir/speed)	Wind-pm (Dir/speed)	Air Temp-am	Air Temp-pm	Water Temp-am	Water Temp-pm	Water Level-am	Water leve- pm	precip-am	precip-pm
7/12						18			11.5			
7/13												
7/14												
7/15												
7/16	1000' o/c	vis 4-5	SW/10-15	W/15-20		10			9	20.25	lite rain	misty
7/17	1000-1500'		W/10							20	lite rain	
7/18	500'		Calm	W/10						21.5	mist	no rain
7/19	1000'		Calm							19.75	lite rain	
7/20	500' solid	500' solid	Calm	SW/5						up 1"	no rain	misty
7/21	2000' o/c											
7/22	2000' brkn	2000' brkn	S/5	NW/10		17			11	19.5	19.5 no rain	
7/23	1000' solid		Calm							19	no rain	
7/24	1500'	2000'	Calm	NE/5-10		14				18	18.5 no rain	
7/25	hi o/c	4000' brkn	Calm	NW 20-25		20			12	18.5	17.5 no rain	
7/26	2000' brkn	2000' o/c	var wind	W/15	16		10			17		
7/27	500' solid		SW/10								mist	
7/28	1500'	3000'	W/5	W/5-10						15.5	16 mist	H20
7/29	1000'	1500' solid	W/10	SW/10-15						16.5	16.5 showers	
7/30	1500'	1000'	NE/10	SE/15						15.5	15 showers	
7/31	10% o/c		Calm							15.5	15.5 no rain	
8/1	1500'	hi overcast	NE/5	E/20						17.5	no rain	
8/2	No ceiling	1000'	SE/20	S/20						20	26 rain	rain
8/3	low ceiling	1000'	S/30	SSW/15						32	rain	no rain
8/4	1000'	1000' solid	SW/5	SW/10-15						35.5	36.75 mist	no rain
8/5	solid		Calm							36	no rain	
8/6	hi overcast		Calm							33.5	no rain	
8/7	hi brkn		Calm							down	no rain	
8/8	1500' solid	2500' solid	Calm	W/5-10						28.75	no rain	no rain
8/9	2500'	2000'	Calm	S/5-10						down	no rain	lite rain
8/10	500'		Calm								lite rain	
8/11	Fog	1500' solid	Calm	W/5-10							22	no rain
8/12												

continued

Table 40 continued (page 3 of 4)

Date	Cloud Cover-am	Cloud cover-pm	Wind-am (Dir/speed)	Wind-pm (Dir/speed)	Air Temp-am	Air Temp-pm	Water Temp-am	Water Temp-pm	Water Level-am	Water leve- pm	precip-am	precip-pm
8/13	300' solid		W/10						19.5		lite rain	steady rain
8/14	1000' brkn	2000' brkn	Calm	NW/10						down 19	no rain	
8/15	Scattered		Calm						down 18.5		no rain	
8/16	Clear		Calm									
8/17	500' solid		W/10						down 16		no rain	
8/18	1000'	1500' brkn	SW/5-10	Calm					down 15		lite rain	no rain
8/19		1000'										no rain
8/20	Sunny	Prtly cloudy	NW/0-5	N/5-10						down		
8/21	2000' solid								down		rain	
8/22			N/5-10	SW					down 1/2"	down		
8/23	2000' solid											
8/24	clear		Calm						down			
8/25	hi brkn	500'	Calm	SW?5					down 3/4"			rain
8/26	Solid	Solid	SSE/5-10	SE/10-15					up 1"	up 1 3/4"	rain	heavy rain
8/27	1500' solid	1500' solid	W/0-5	W/5-10					up 3"	up 2"		
8/28												
8/29	200' ceiling		SSW/15	W/25					18.3	up 4.5	rain	rain
8/30	500'	brkn	W/0-5	W/5-10					down		16 no rain	rain
8/31	500' solid	solid sun	SE/5-10	SW/1-15							16 little	little
9/1	brkn		calm	W/5-10					down 3/4		no rain	
9/2	brkn		W/5						down 1/2			
9/3	brkn/solid	1500' brkn	calm	NW/5					down	down 3/4"	lite rain	
9/4	1500' solid	1000' solid	lite wind	SW/25					up 1"		intermittant rain	rain
9/5	1000'		W								rain	
9/6	1000'	2000' brkn	W/15	NW/10					up 24	25.75	rain	rain
9/7	1000' brkn	1000' solid	Calm	SSE					24.5		no rain	rain
9/8	Scattered	Scattered	Calm						24.25		no rain	
9/9	high O/C		Calm						24		rain	
9/10	500' solid		Calm						down		no rain	
9/11	1000' solid		Calm	WSW/15-20						22	intermittant	
9/12	2000' solid		Calm							22		
9/13	Clear		Calm							22.25		

continued

Table 40 continued (page 4 of 4)

Date	Cloud Cover-am	Cloud cover-pm	Wind-am (Dir/speed)	Wind-pm (Dir/speed)	Air Temp-am	Air Temp-pm	Water Temp-am	Water Temp-pm	Water Level-am	Water leve-pm	precip-am	precip-pm
9/14	Clear	Scattered	Calm	N/5-10		cool				21		
9/15	CAVU									20		
9/16	CAVU									19		
9/17	CAVU		Calm							18		
9/18	CAVU				Cold					17.25		
9/19	High										no	
9/20	1000'		S/light	windy							no	
9/21	1500' solid		SW/5-10							16		
9/22			Calm							19	light mist	

Table 42. Daily atmospheric and hydrological data from the Middle Fork Goodnews River weir site, 2001.

Date	Time Observed	Sky Code	Precipitation		Wind	Temperature		Water Level (in)
			Code	Amount (mm)		Air	Water	
26-Jun	am	1			0			
27-Jun	am	1			NW 10	28	10	21
28-Jun	am	4			S 5	18	10	21
29-Jun	am	4 B		35	S 10		9	22
30-Jun	am	4			0	7	8	23
1-Jul	am	4 A		2	S 10	9	8	24
2-Jul	am	4 A		>1	S 5	10	8	23
3-Jul	am	4 A		>1	NW 15	16	10	23
4-Jul	am	4 A		>1	NW 5-10	11	10	22
5-Jul	am	4 A		0	SW 0-5	8	9	21
6-Jul	am	4 A			0	9	11	21
7-Jul	am	3			SW 5	14	10	20
8-Jul	am	3			SW 10	11	10	20
9-Jul	am	1			NE 5	3	9	19
10-Jul	am	4 A		>1	SE 5	7	9	19
11-Jul	am	4 B		44	0	7	8	19
12-Jul	am	4 B		42	SE 5	7	8	19
13-Jul	am	4 B		66	0	7	8	19
14-Jul	am	3				10	8	20
15-Jul	am	4 B		70		11	9	20
16-Jul	am	4 A		28	SW 5	9	9	20
17-Jul	am							19
	pm							19
18-Jul	am	4 A						19
	pm	1			SE 10	16	10	19
19-Jul	am	4 A		9	SE 10	11	11	20
	pm	4 B			E 5	13	10	23
20-Jul	am	4 B		6	S 5	10	10	25
21-Jul	am	4		4				29
	pm	4			SW 5	12	9	27
22-Jul	am	4				15	11	27
	pm	4			SW 10	12	11	26
23-Jul	am	4			SW 10	15	13	26
	pm	3			SW 10	12	12	26
24-Jul	am	4				18	12	25
	pm	4			SW 5	11	10	24
25-Jul	am	4			SW 5	16	11	23
	pm	4			SW 5-10	12	10	23
26-Jul	am	4			W 5	15	11	22
	pm	3			W 10	11	10	21
27-Jul	am	4				14	12	20
	pm	2			SE 8	10	10	20

continued

Table 42 continued (page 2 of 3)

Date	Time Observed	Sky Code	Precipitation		Wind	Temperature		Water Level (in)
			Code	Amount (mm)		Air	Water	
28-Jul	am	4			E 10	22	12	20
	pm	4			SE 10	14	12	19
29-Jul	am	5				15	11	18
	pm	5 A			SW 5-10	15	10	18
30-Jul	am	5 A		3		15	11	18
	pm	4			W 10	9	10	17
31-Jul	am	4			W 5	13	10	17
	pm	3			NW 10	10	10	16
1-Aug	am	3				12	10	16
	pm	3			SW 10	13	14	16
2-Aug	am	5				10	11	15
	pm	4 A			N 10	15	11	15
3-Aug	am	4 A				9	9	14
	pm	2			E 9	17	10	14
4-Aug	am	2			NE 7	10	9	14
5-Aug	am	2				4	11	14
	pm	1			W 10	11	14	13
6-Aug	am	3				2	11	11
7-Aug	am	2				2	10	12
	pm	1			W 9	17	13	12
8-Aug	am	2				8	11	12
	pm	3			S 10	19	13	11
9-Aug	am	4					11	12
	pm							
10-Aug	am	3				5	11	11
							11	11
11-Aug	am				SW 10	8	10	11
					W 9	11	11	11
12-Aug	am	4				9	10	11
	pm	4			W 5	15	11	11
13-Aug	am	4				12	11	11
	pm	4 B		11	SW 10	14	11	11
14-Aug	am	5				10	11	12
	pm	5 B		4	SE 5-10	14	11	12
15-Aug	am	5 B			SE 5-10	14	11	12
	pm	4 A		10	SW 5	13	12	12
16-Aug	am	4			SW 5	10	13	13
17-Aug	am	4				10	11	12
	pm	4			SW 5	12	12	12
18-Aug	am	4			SW 5	11	10	11
19-Aug	am	4 A		8	SE 10	11	10	11
20-Aug	am	4 B		7	W 20	7	10	15
	pm	3 A			N 25	12	10	14
21-Aug	am	3		1		7	9	14
	pm	1			NW	16	11	13

continued

Table 42 continued (page 3 of 3)

Date	Time Observed	Sky Code	Precipitation		Wind	Temperature		Water Level (in)
			Code	Amount (mm)		Air	Water	
22-Aug	am	3				12	10	13
	pm	4 A			S 5	11	10	13
23-Aug	am	5		11		9	9	13
	pm	3			SW 5	12	12	13
24-Aug	am	4		1		9	10	13
25-Aug	am	3				14	12	12
26-Aug	am	4 A		6		12	11	12
27-Aug	am	4 A		>1		9	10	12
28-Aug	am	4		>1	NE 5	12	10	12
29-Aug	am	4 A		3		11	10	12
30-Aug	am	4		>1		10	10	13
31-Aug	am	3 A		5		9	9	13
1-Sep	am	4		1	W 5	10	9	12
2-Sep	am	3 A		>1	N5	8	8	12
3-Sep	am	4		>1	S5	8	8	11
4-Sep	am	3 A		7	SW 10	8	8	12
5-Sep	am	4 A		7	W 15	7	7	13
6-Sep	am	4 A		8		8	8	15
7-Sep	am	3		>1		8	8	15
8-Sep	am	2				10	8	14
9-Sep	am	1				9	7	14
10-Sep	am	4				10	8	13
11-Sep	am	4			E 10	10	8	13
12-Sep	am	3		>1		10	8	12
13-Sep	am	3		>1		10	8	12
14-Sep	am	4				9	8	12
15-Sep	am	3				11	8	12
16-Sep	am	1				12	7	11
17-Sep	am	4				9	8	11
18-Sep	am	1				7	8	11
19-Sep	am	3				4	7	10
20-Sep	am	4 A		>1	E 10	8	8	10
21-Sep	am	3		7	E 8	8	7	16
22-Sep	am	1				9	7	16
23-Sep	am	4 A		6	S 5	6	8	15
24-Sep	am	3		3	N 10	8	7	16
25-Sep	am	3		>1		5	6	15
26-Sep	am	4 A		1		4	6	14
27-Sep	am	5		3		6	7	14
28-Sep	am	3		>1		1	5	14
29-Sep	am	3			N 10	5	6	13
30-Sep	am	4				1	5	13
1-Oct	am	3 A		10	SW 10	5	5	14

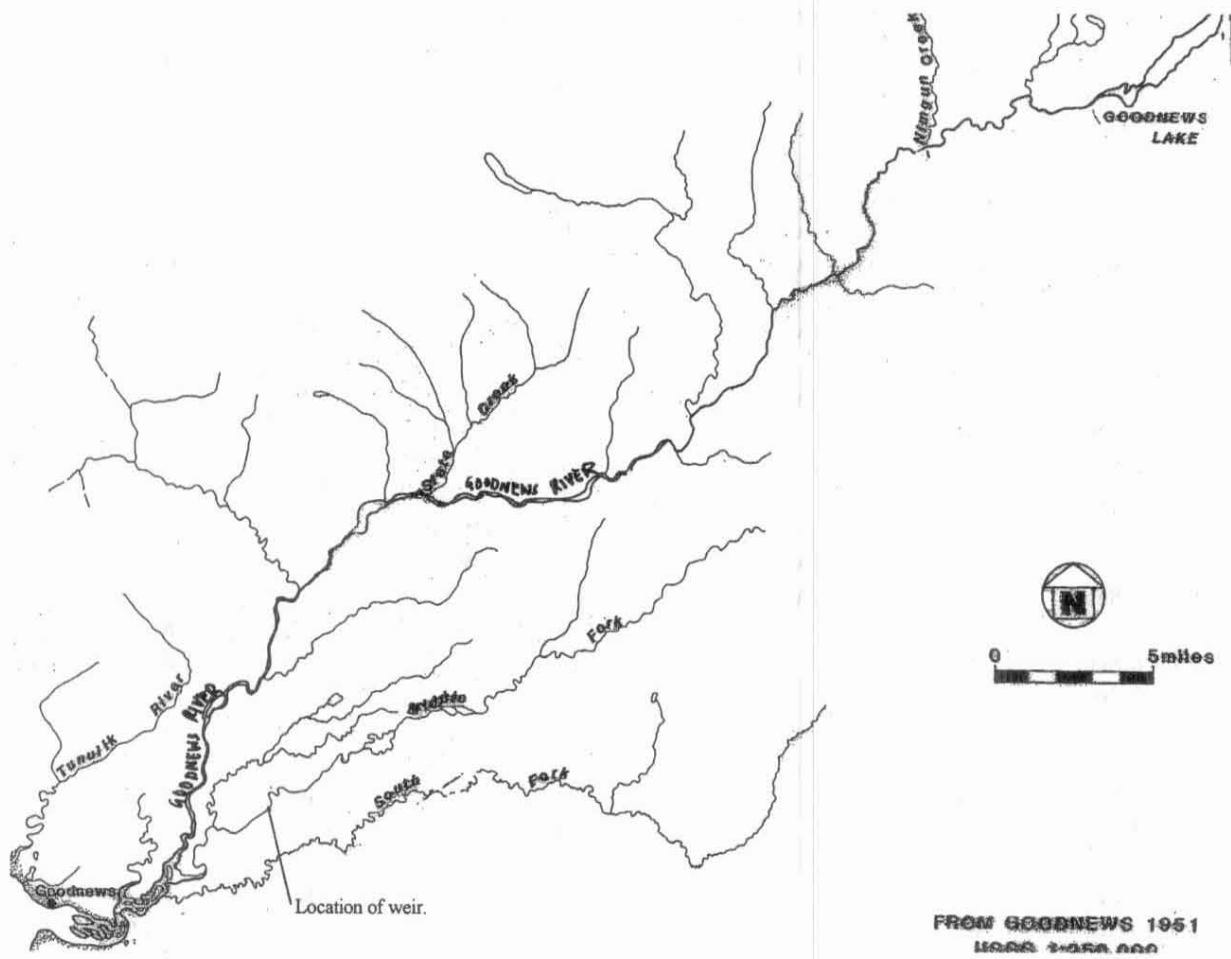


Figure 1. Map of Goodnews River drainage.

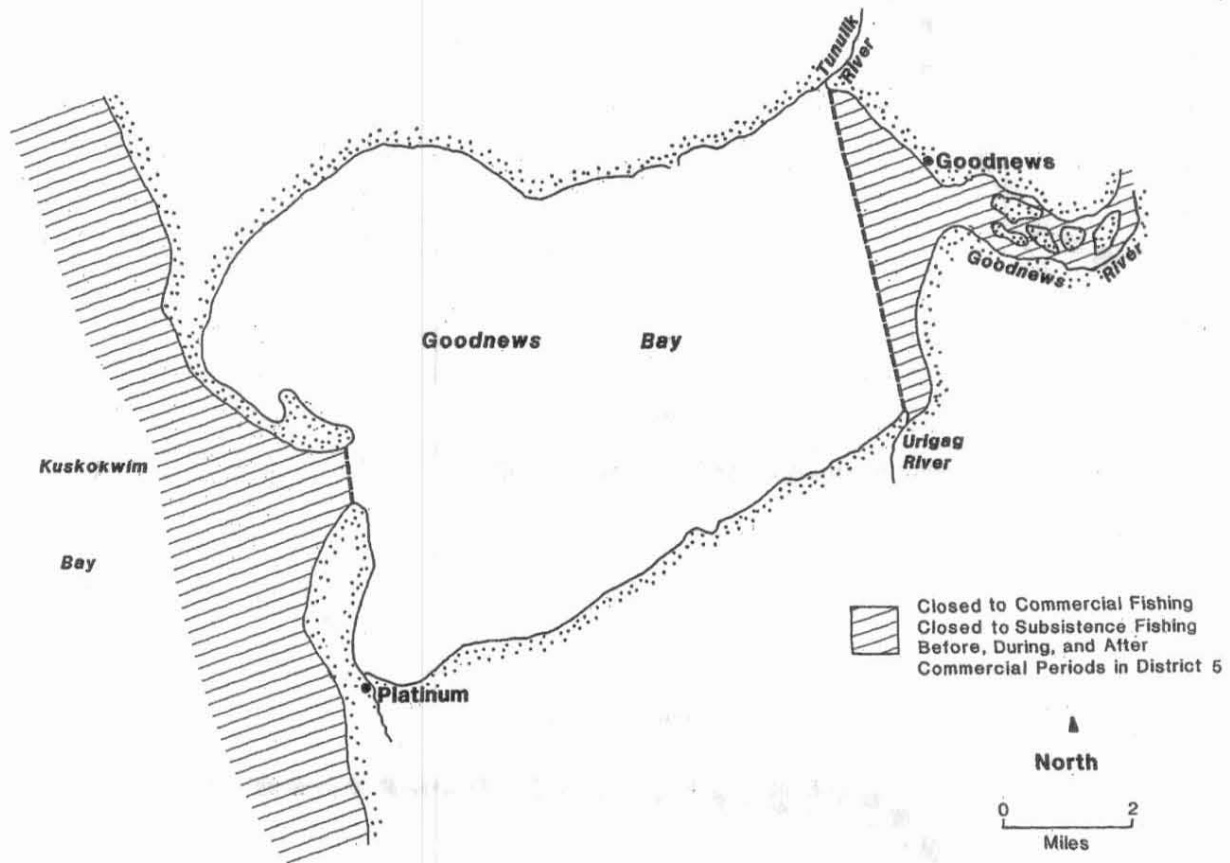


Figure 2. Map of District 5 (Goodnews Bay).

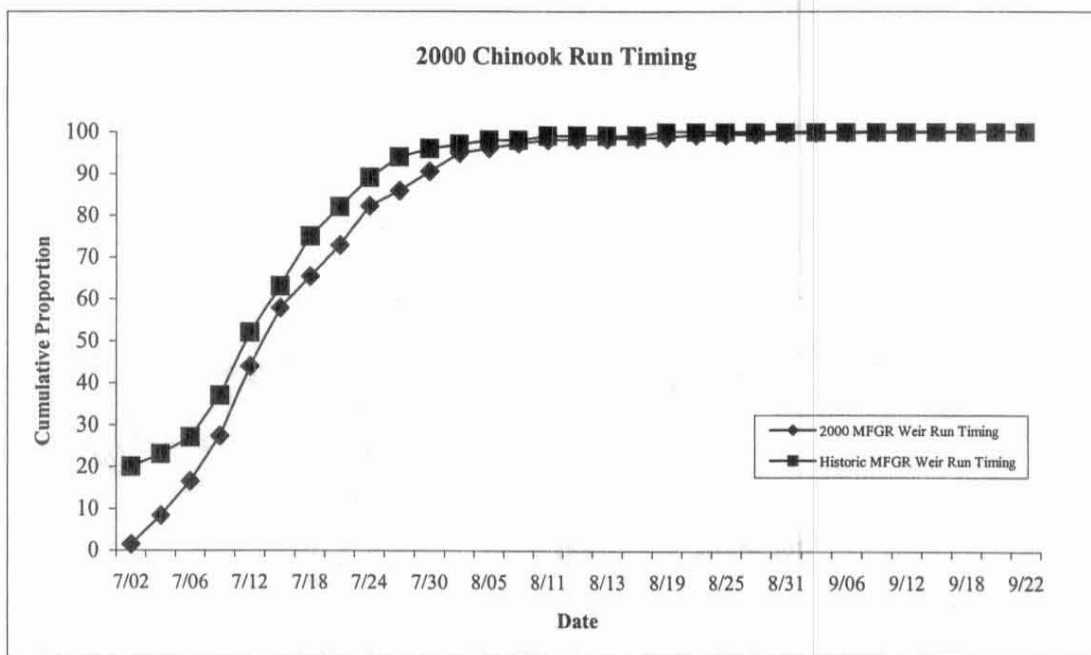


Figure 3. Chinook salmon run timing at the MFGR weir, 2000.

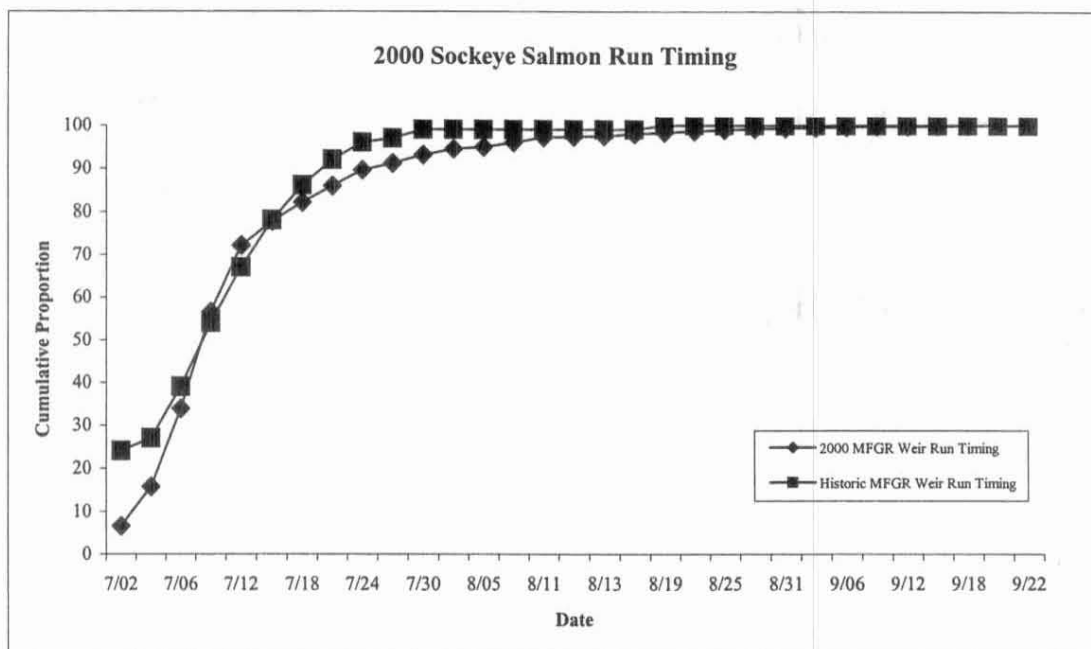


Figure 4. Sockeye salmon run timing at the MFGR weir, 2000.

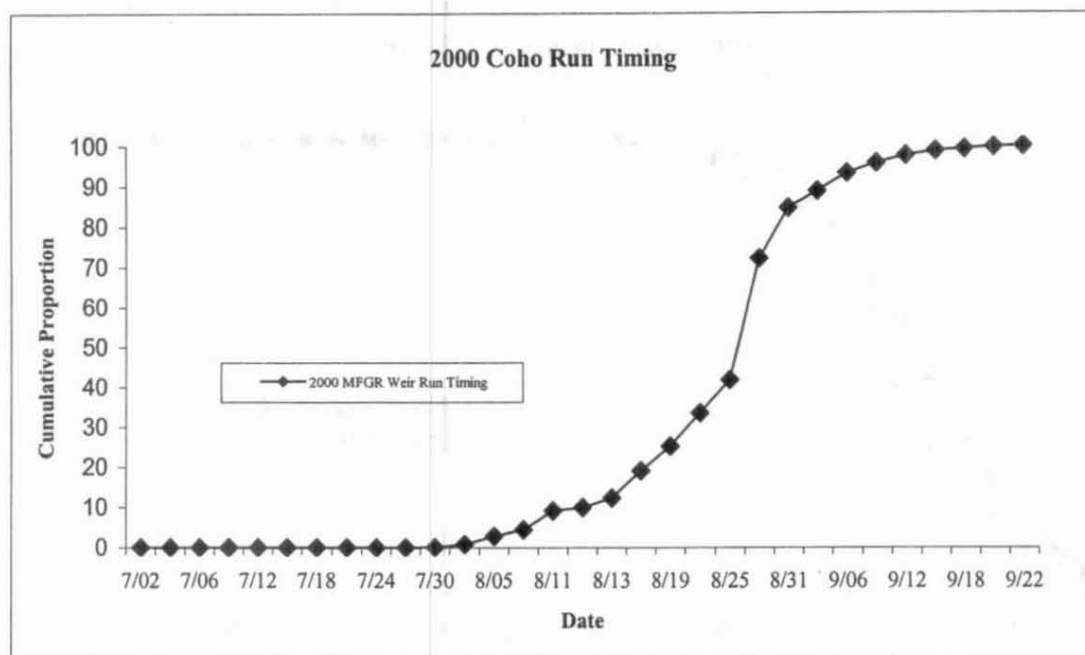


Figure 5. Coho salmon run timing at the MFGR weir, 2000.

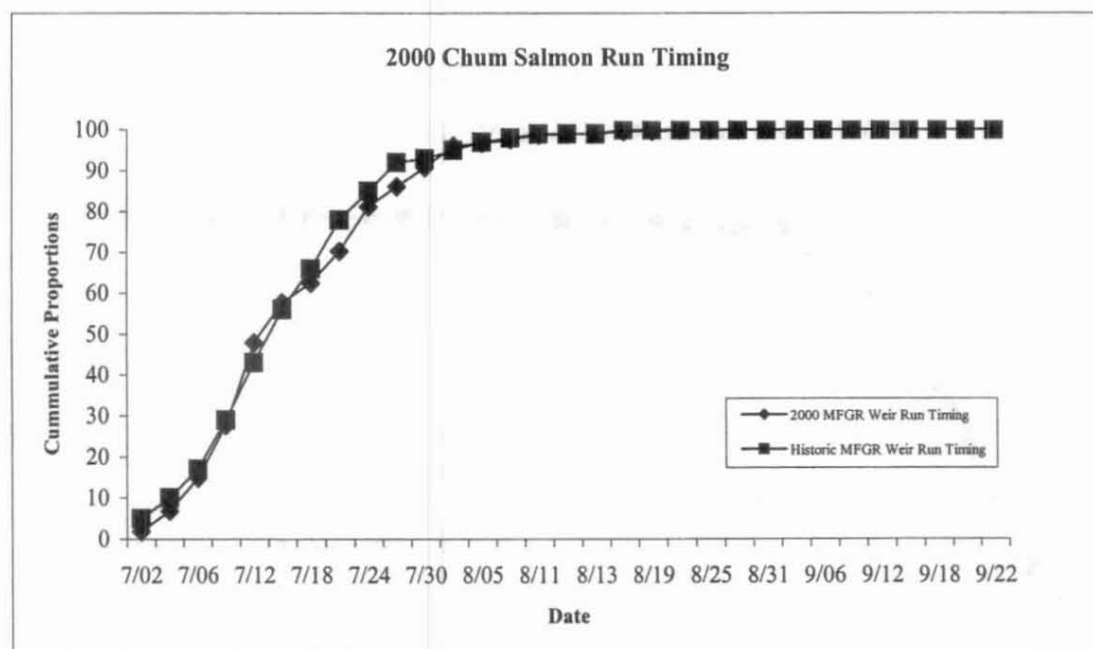


Figure 6. Chum salmon run timing at the MFGR weir, 2000.

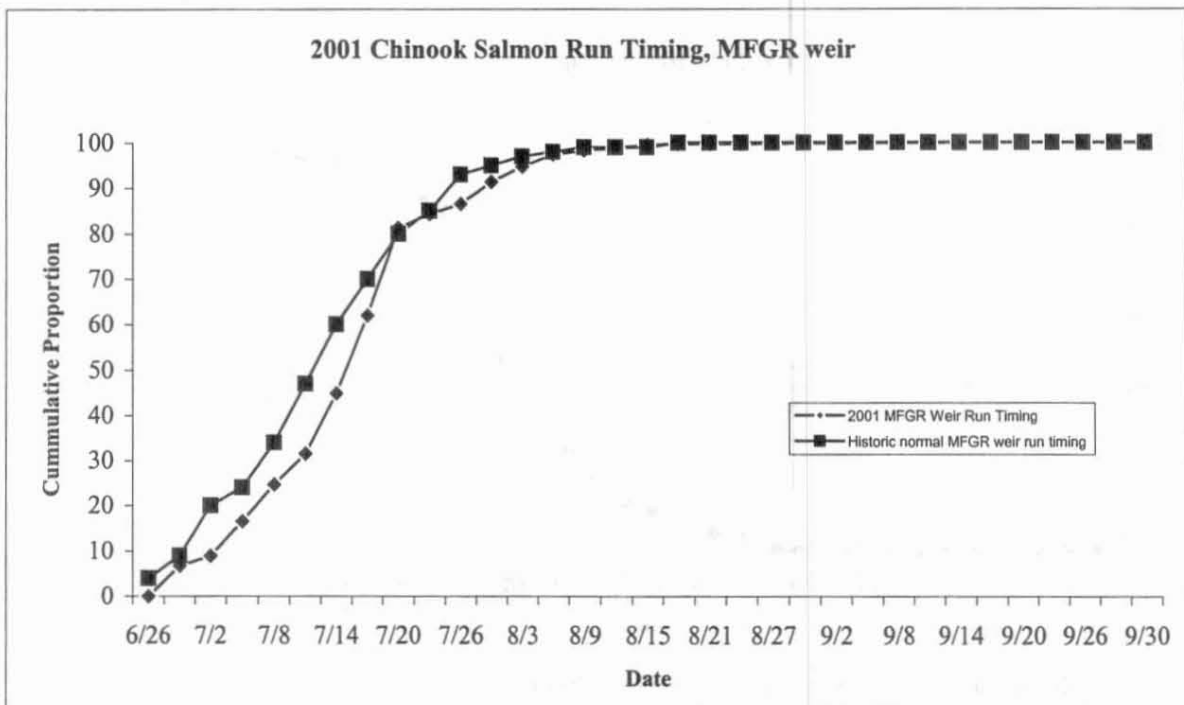


Figure 7. Chinook salmon run timing at the MFGR weir, 2001

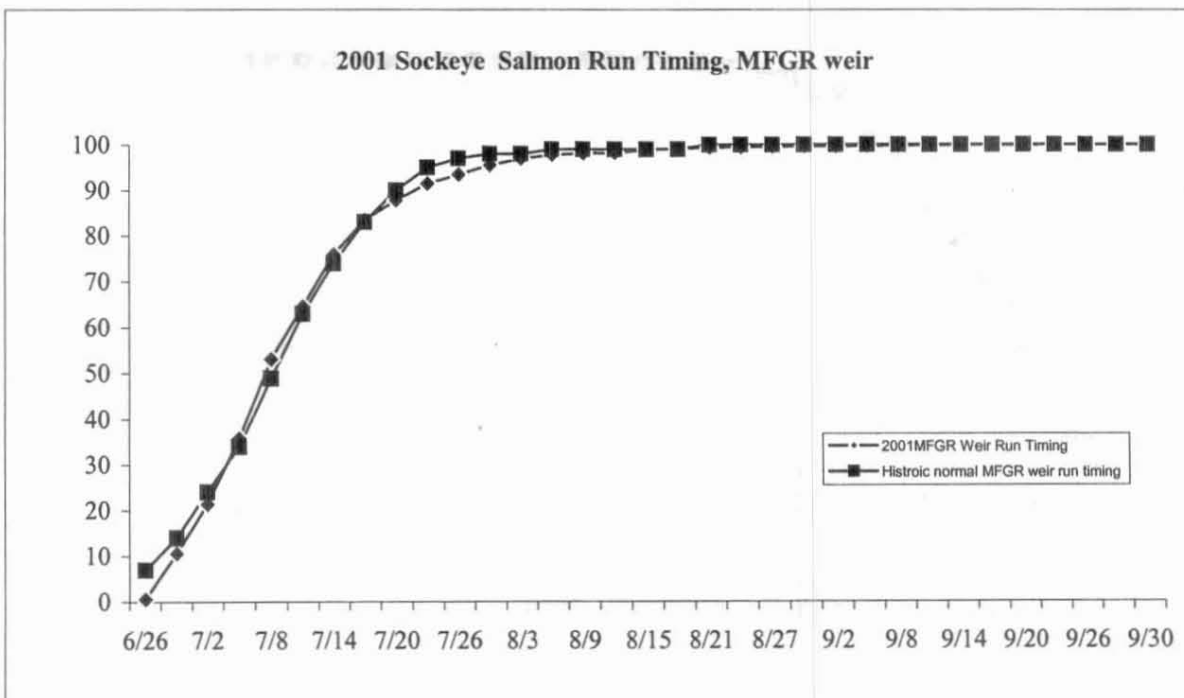


Figure 8. Sockeye Salmon run timing at the MFGR weir, 2001.

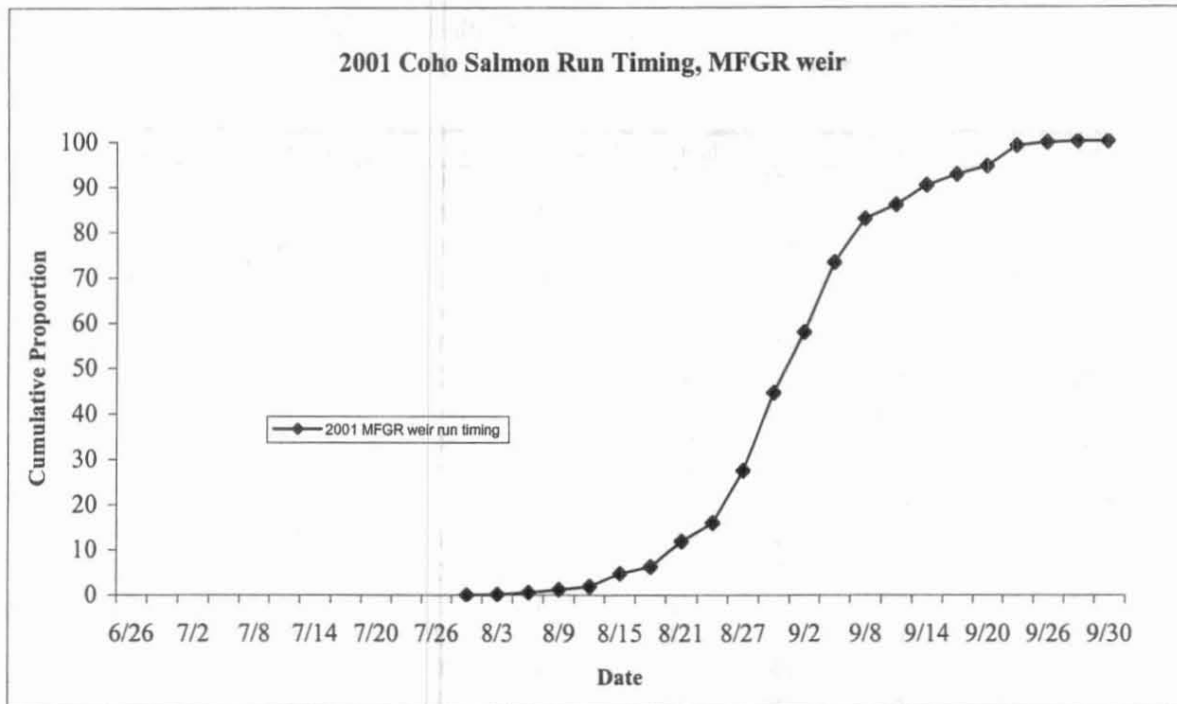


Figure 9. Coho salmon run timing at the MFGR weir, 2001.

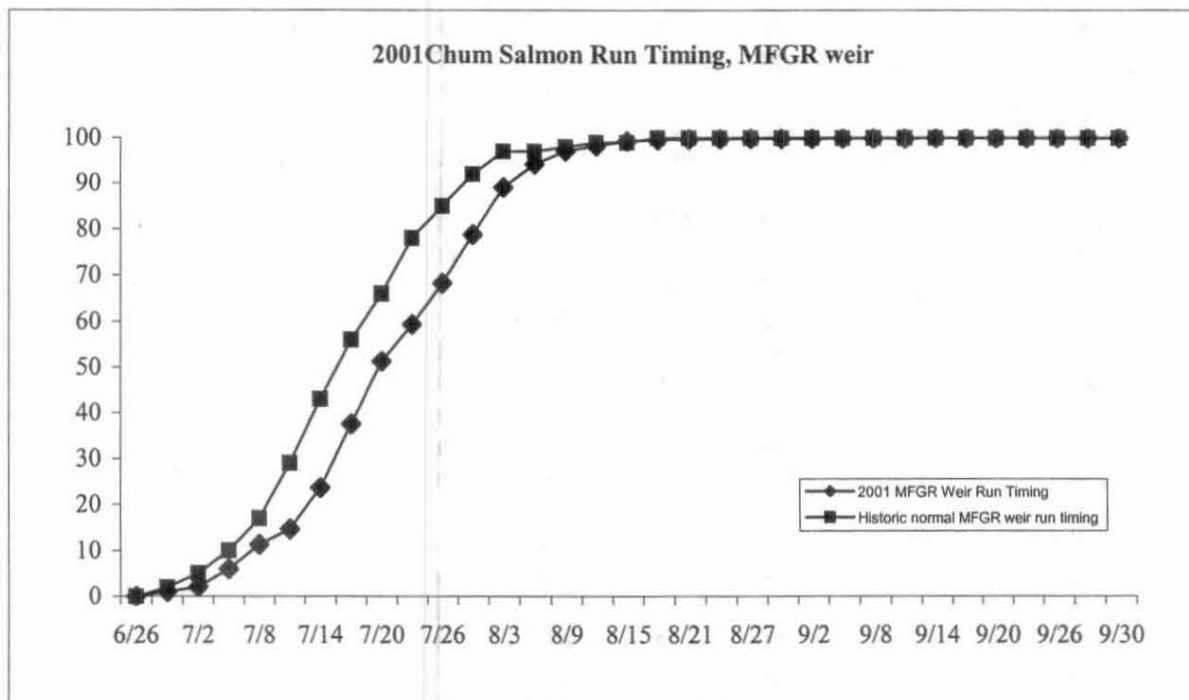


Figure 10. Chum salmon run timing at the MFGR weir, 2001.

Appendix A1. Daily fish passage counts at the Middle Fork Goodnews River weir, 2000.

Date	Chinook	Sockeye	Chum	Coho	Pink	Dolly Varden	White Fish
7/02	36	2,157	256	0	0	3	0
7/03	173	2,970	684	0	0	0	0
7/04	106	2,489	382	0	6	6	0
7/05	35	1,710	270	0	11	6	0
7/06	66	1,723	453	0	4	7	0
7/07	21	1,941	154	0	11	3	0
7/08	67	2,631	538	0	32	27	0
7/09	183	2,833	1,077	0	114	36	0
7/10	128	1,866	685	0	66	59	9
7/11	55	1,372	765	0	73	34	8
7/12	236	1,836	1,351	0	155	35	4
7/13	62	893	872	0	78	44	6
7/14	2	314	56	0	12	16	6
7/15	285	620	416	0	23	98	1
7/16	100	544	175	0	13	47	5
7/17	26	404	320	0	40	49	5
7/18	63	484	160	0	42	47	3
7/19	29	315	332	0	71	143	3
7/20	64	438	423	0	70	145	2
7/21	95	477	335	0	70	72	10
7/22	143	608	725	0	157	75	18
7/23	34	137	387	0	46	22	2
7/24	61	458	390	0	103	53	4
7/25	56	340	285	0	53	25	2
7/26 ^a	10	79	144	0	28	10	3
7/27	25	108	256	0	47	5	1
7/28	71	272	334	0	75	22	1
7/29	27	173	189	1	73	11	5
7/30	19	193	114	7	82	12	3
7/31	83	252	323	37	133	7	6
8/01	8	109	230	26	91	6	5
8/02	19	97	173	93	65	1	3
8/03	7	83	64	157	38	0	0
8/04	12	16	11	165	5	0	0
8/05	10	31	14	77	10	0	0
8/06	17	131	75	195	34	0	0
8/07	3	49	30	42	16	0	0
8/08	9	174	30	76	26	0	0
8/09	10	238	38	121	28	0	0
8/10	8	118	78	453	31	3	0
8/11	2	32	37	340	31	2	0
8/12	4	56	17	160	36	1	0
8/13	2	39	28	463	26	3	0
8/14	2	78	32	677	59	3	5
8/15	0	29	22	276	27	3	8
8/16	2	37	5	375	34	7	8
8/17	3	41	8	257	20	13	22
8/18	1	32	5	476	23	10	16

continued

Appendix A1. continued (page 2 of 2)

Date	Chinook	Sockeye	Chum	Coho	Pink	Dolly Varden	White Fish
8/19	3	52	5	481	14	35	11
8/20	4	40	12	682	19	38	18
8/21	3	39	9	562	9	36	15
8/22	4	30	2	382	8	13	11
8/23	1	45	3	867	18	28	15
8/24	2	33	4	423	16	36	41
8/25	0	9	1	356	12	48	30
8/26	1	24	4	2,468	28	188	15
8/27	2	42	3	3,212	31	452	31
8/28	0	18	1	292	11	225	13
8/29	2	28	3	2,021	40	378	10
8/30	3	23	0	273	2	154	4
8/31	1	7	1	164	1	219	4
9/01	5	21	1	347	4	751	6
9/02	0	12	1	274	5	676	5
9/03	0	13	1	205	0	385	2
9/04	0	12	0	285	2	89	3
9/05	0	21	3	258	3	198	3
9/06	0	11	0	335	2	66	4
9/07	1	10	0	147	0	13	7
9/08	0	18	0	171	2	414	6
9/09	0	11	0	178	0	404	4
9/10	0	11	0	154	3	184	1
9/11	1	7	0	74	2	57	0
9/12	0	6	0	131	1	64	2
9/13	0	5	0	87	0	24	4
9/14	0	5	0	51	1	7	0
9/15	0	4	1	88	0	47	2
9/16	0	8	0	62	1	62	4
9/17	1	5	0	17	1	57	3
9/18	1	3	0	16	1	3	4
9/19	0	3	0	14	2	31	2
9/20	0	10	0	29	2	34	1
9/21	1	12	0	43	1	13	1
9/22	0	7	0	53	0	16	4
Totals	36	605	55	15,202	242	5,445	286

^a Hole in weir. A panel was knocked ajar by a passing boat on 7/25 at 20:00. Discovered and repaired on 7/26 at 21:00. Counts are considered partial for this period, and no passage estimates were made.

Appendix A2. Daily fish passage counts at the Middle Fork Goodnews River weir, 2001

Date	Chinook	Sockeye	Coho	Chum	Pink	Dolly Varden	White Fish
26-Jun	1	118			6		
27-Jun	61	626			71		
28-Jun	134	647			76		18
29-Jun	162	835			104		9
30-Jun	8	571			69		7
1-Jul	21	575			69	5	6
2-Jul	90	1,107			148	0	4
3-Jul	203	1,048			300	3	3
4-Jul	111	1,104			318	3	6
5-Jul	92	903			441	0	5
6-Jul	99	1,467			219	11	5
7-Jul	112	945			602	4	19
8-Jul	226	1,215			609	1	18
9-Jul	16	173			200	0	4
10-Jul	242	1,471			322	0	2
11-Jul	106	768			367	5	5
12-Jul	188	1,024			440	7	3
13-Jul	334	760			488	0	4
14-Jul	194	595			1,486	16	11
15-Jul	264	587			1,224	48	10
16-Jul	498	506			1,344	72	16
17-Jul	151	496			1,176	52	11
18-Jul	162	246			1,094	74	0
19-Jul	845	521			2,147	93	117
20-Jul	28	147			436	17	30
21-Jul	66	207			736	35	46
22-Jul	53	356			730	39	60
23-Jul	44	206			691	49	47
24-Jul	54	177			637	84	82
25-Jul	30	97			1,058	117	124
26-Jul	37	156			696	41	120
27-Jul	88	162			1,093	74	194
28-Jul	105	149			993	54	181
29-Jul	66	115	2		744	59	93
30-Jul	27	76	2		432	34	54
31-Jul	100	85	21		767	38	86
1-Aug	39	68	2		919	41	112
2-Aug	6	21	2		478	13	42
3-Aug	6	51	4		174	7	12
4-Aug	37	53	23		508	14	55
5-Aug	78	84	18		466	15	38
6-Aug	25	46	33		402	10	37
7-Aug	23	26	16		270	26	25
8-Aug	14	6	28		181	9	1
9-Aug	15	22	87		319	18	19
10-Aug	7	4	42		76	0	10
11-Aug	1	2	33		87	11	8

continued

Appendix A2. Continued (page 2 of 2)

Date	Chinook	Sockeye	Coho	Chum	Pink	Dolly Varde	White Fish
12-Aug	21	31	64	148	8	6	10
13-Aug	4	82	95	110	8	7	13
14-Aug	11	29	260	97	11	5	20
15-Aug	21	18	203	72	11	16	18
16-Aug	4	35	141	37	8	13	23
17-Aug	4	16	126	26	2	6	16
18-Aug	0	7	34	9	0	3	11
19-Aug	0	19	272	21	0	12	15
20-Aug	0	14	724	16	2	12	11
21-Aug	0	11	101	6	0	1	10
22-Aug	0	8	102	8	5	1	7
23-Aug	0	7	254	7	2	1	12
24-Aug	0	4	439	3	6	0	1
25-Aug	2	5	426	6	1	13	9
26-Aug	4	16	1,191	10	4	17	19
27-Aug	0	4	646	1	0	7	6
28-Aug	1	4	1,357	1	4	9	6
29-Aug	1	6	558	1	4	20	3
30-Aug	0	2	1,440	3	3	41	6
31-Aug	0	5	1,198	1	7	60	5
1-Sep	1	6	1,162	1	1	107	7
2-Sep	1	2	262	2	4	62	4
3-Sep	1	1	428	1	8	99	2
4-Sep	1	6	1,005	8	6	142	1
5-Sep	2	4	1,585	1	6	180	4
6-Sep	0	12	1,510	3	10	142	5
7-Sep	0	5	272	2	5	71	5
8-Sep	1	1	100	1	2	32	3
9-Sep	0	4	232	1	5	122	15
10-Sep	0	3	118	0	3	21	2
11-Sep	0	3	261	2	2	81	5
12-Sep	0	3	334	0	3	69	0
13-Sep	0	2	141	2	3	47	1
14-Sep	1	3	367	0	4	1	0
15-Sep	0	3	43	0	0	36	0
16-Sep	0	1	65	0	2	32	4
17-Sep	1	1	356	0	0	33	7
18-Sep	0	1	115	0	0	2	6
19-Sep	0	1	102	0	1	4	5
20-Sep	0	2	137	0	2	5	2
21-Sep	0	4	460	6	0	6	2
22-Sep	0	3	272	1	1	36	5
23-Sep	0	4	153	0	0	0	3
24-Sep	0	0	75	0	0	3	4
25-Sep	0	0	62	0	0	16	7
26-Sep	0	0	15	0	0	4	0
27-Sep	0	0	14	1	1	10	4
28-Sep	0	1	23	0	0	3	8
29-Sep	0	0	13	1	0	30	1
30-Sep	0	1	0	0	0	2	0
	82	400	19,313	616	155	1,648	333

1% of chinook escapement was estimated, total escapement is 5,405

7% of sockeye escapement estimated total escapement is 22,606.

Appendix B1. Summary of 2001 roe retention study.

A roe retention study was conducted from 4 to 11 August in 2001 in the Goodnews River and Middle Fork Goodnews Rivers. The objective of this study was to determine if there was any difference in roe retention between these two forks. Spawned-out female chum and chinook salmon were examined in the Middle and North forks of the Goodnews River. The Middle Fork has a resistance-board weir at river mile 11 and the North Fork does not have a weir. Increased roe retention in the Middle Fork may be an indication of stress or injury caused by the weir. Conditions during the study were optimal, decreasing water levels with good visibility.

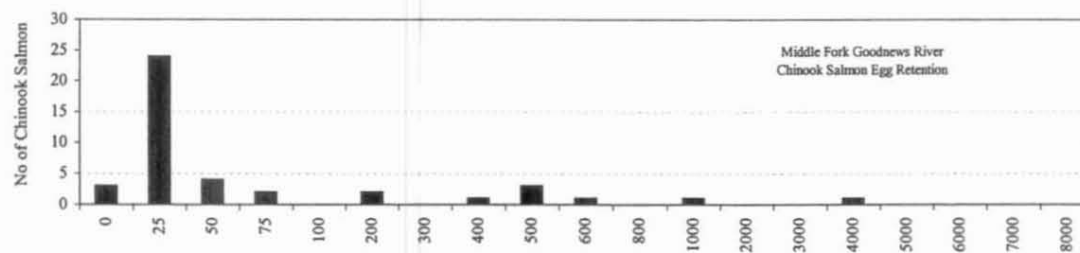
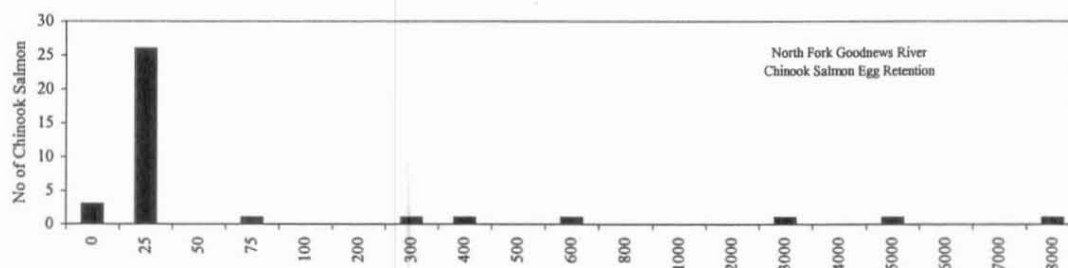
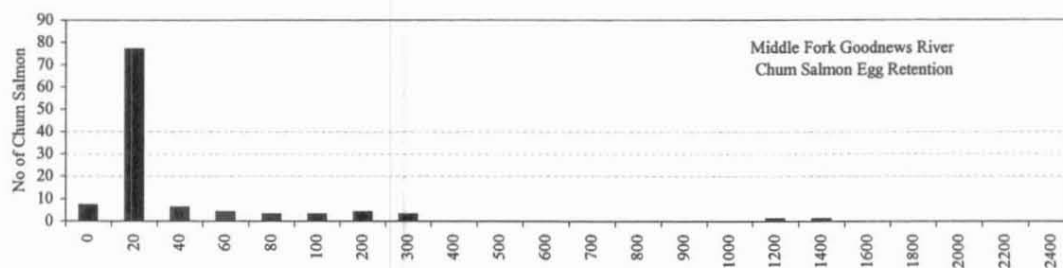
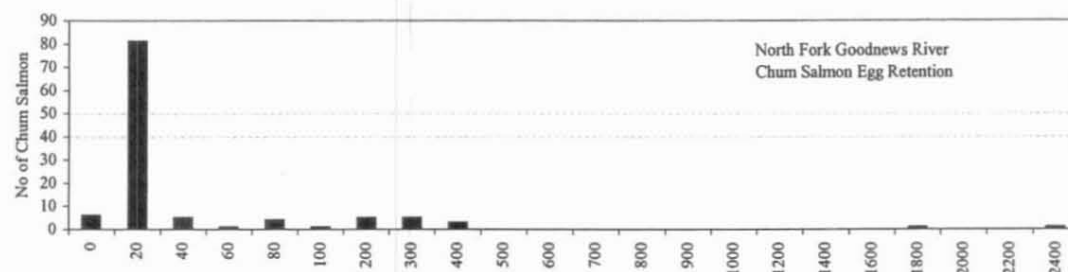
Salmon carcasses were located while observing from a jet-equipped skiff and conducting foot surveys along gravel bars. Female salmon carcasses were examined to determine if the abdominal cavity was intact. If the abdominal cavity was intact, the female was cut open and all the eggs and/or egg skeins were removed, placed in a sampling tray and the total number of eggs were counted. A plastic egg counter, with dimples to hold 100 eggs, was used when counting large numbers of eggs. Female salmon carcasses without an intact abdominal cavity were not used in the study. All samples from the Middle Fork Goodnews River were collected upstream from the weir.

Egg retention data was collected from 222 chum salmon and 78 chinook salmon in the Goodnews River drainage. Salmon were examined between river mile 12 and 35 in the Middle Fork and 20 and 45 in the North Fork. Attachment 1 shows histograms and summary statistics for the number of eggs retained for chum and chinook salmon in the Middle and North forks of the Goodnews River. The mean number of eggs retained in the chum salmon samples was 69 in the North Fork and 45 in the Middle Fork. The median number of eggs retained in the chum salmon samples was 5 in the North Fork and 6 in the Middle Fork. The mean number of eggs retained in chinook salmon samples was 425 in the North Fork and 177 in the Middle Fork. The median number of eggs retained in chinook salmon samples was 69 in the North Fork and 45 in the Middle Fork.

No differences between the median or mean roe retention rates were found between the two forks at the $\alpha = 0.05$ level. Using a t-test to compare the means between the two forks resulted in $t = -0.77$, $p = 0.44$, $df = 185$ for chum salmon and $t = -0.99$, $p = 0.33$, $df = 44$ for chinook salmon. The Wilcoxon Rank Sum test (Mann-Whitney) was used to compare the medians between the two forks and resulted in $W = 12561$, $p = 0.39$ for chum salmon and $W = 1729$, $p = 0.48$ for chinook salmon.

The North Fork chinook salmon samples may have been influenced by sport fishing mortality. One chinook salmon with a large number of retained eggs was found below a popular sport fishing area with a fresh wound in its side. Other chinook salmon with similar wounds and high egg retention rates were examined in the North Fork and found below sport fishing areas. These other chinook salmon were not included in the study because the abdominal cavity had been breached by bird activity.

Appendix B2. Number of eggs retained from chinook and chum salmon, Goodnews and Middle Fork Goodnews Rivers, 2001



Number of Eggs Retained